THE BRITISH JOURNAL
OF
OPHTHALMOLOGY

APRIL, 1946

COMMUNICATIONS

EPIDEMIC KERATO-CONJUNCTIVITIS ASSOCIATED WITH SKIN LESIONS*

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IN a General Hospital in Egypt during the year 1944-1945, 33 cases with associated lesions of the skin and kerato-conjunctivitis were seen. So far as we can discover this concurrence has not been emphasised in either the ophthalmic or dermatologic literature. Apart from the close association with lesions of the skin the kerato-conjunctivitis in these cases was clinically indistinguishable from epidemic virus kerato-conjunctivitis. Indeed it appeared to us only late in the series that the close association of lesions of the skin with some of the cases of kerato-conjunctivitis possibly signified that these cases might be of a nature different from epidemic virus kerato-conjunctivitis. It appears worthwhile to describe these cases and to determine if possible their relationship to epidemic kerato-conjunctivitis. The appearance during the

* Received for publication, August, 1945.

same twelve-month period of an exactly similar number of cases of typical epidemic kerato-conjunctivitis supplied material for comparison. In none of these latter cases was a lesion of the skin present. These will be referred to as the " control group."

The 66 cases constituted 1·1 per cent. of all cases and 19 per cent. of all cases with conjunctivitis seen in one year in the eye out-patient department of the General Hospital. The remaining 81 per cent. of cases with conjunctivitis showed no exceptional incidence of lesions of the skin. Ten of the cases were referred from the skin department of the hospital.

Skin lesions in 66 cases with kerato-conjunctivitis

Number of cases with no affection of the skin (" control cases ")	33
Number of cases with affection of the skin	33

Detail of lesions in 33 cases with affection of the skin

Seborrhoeic dermatitis	= 18 cases
Severe acne	= 2 ,,
Severe acne and impetigo	= 1 ,,
Chronic blepharitis of the squamous type	= 6 ,,
Impetigo of the face	= 2 ,,
Recurrent styes	= 1 ,,
" Dermatitis septic " of the ear lobe ...	= 1 ,,
Generalised arsenical dermatitis ...	= 1 ,,
Sycosis barbae	= 1 ,,

The majority of the cases were of the seborrhoeic type. In all cases the face or head was affected. In a few there was also an affection of the skin of the trunk or limb. The following cases typify those with associated lesions of the skin :—

Case 42 illustrated in Fig. 1 belongs to the seborrhoeic dermatitis group. He is an officer who stated that 3½ years before he had been treated in a General Hospital for impetigo of the face and scalp. Fifteen days before the onset of kerato-conjunctivitis in the right eye the scalp became covered with scabs which spread to the right brow, right upper-lid, and right side of the forehead. After the eye condition had developed the skin appearances were as follows:—scaling and scabbing of the right parietal region; erythema and scanty papulation of right forehead; redness and scabbing of right eyebrow region; erythema and fine scaling of right upper lid and outer canthus, papular rash of right cheek and side of neck and very mild folliculitis of the left cheek. The right eyelid showed ptosis and the right pre-auricular gland was tender but not palpable. There was a watery discharge from the eye and the conjunctiva showed a red " cellophaned " surface.

The appearance of the cornea on the 6th day is illustrated in Fig. 2. Superficial flecks of opacity covered the central area. They were best seen by indirect light on slit-lamp examination. More peripherally there were larger dots several of which stained with fluorescein. On the 11th day he suffered very severe pain in the eye. The eye was more injected and Descemet's membrane

showed numerous folds (see Fig. 3). There was a very pronounced hazing and bedewing of the whole corneal epithelium. On the 16th day the left eye also became red and uncomfortable. The appearance of the cornea of the left eye on the 22nd day is illustrated in Fig. 4. By the 33rd day the condition of the skin and eyes had healed and he was discharged from hospital. The visual acuity of the right eye which on the 11th day had fallen to 3/60 was 6/6 on the day of discharge. The left eye has always been amblyopic. It was very noticeable that the skin and eye conditions varied *pari passu*.

Fig. 5 illustrates the appearance of the cornea of case 35 on the 17th day. His first skin trouble occurred in England two years previously when there

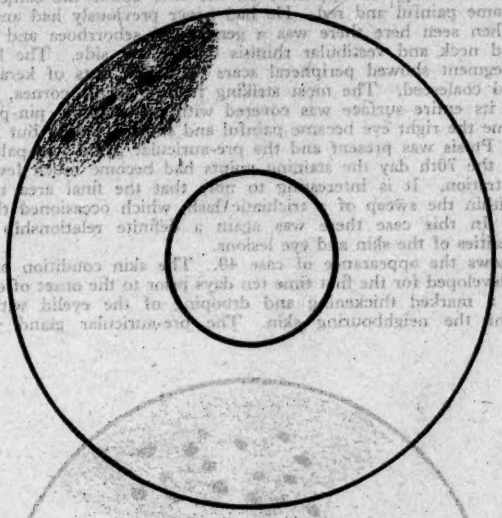

FIG. 4.

Illustrating the left cornea of Case 42 on the 22nd day. There are several peripheral dots of opacity, one of which stains with fluorescein. The neighbouring epithelium is hazy.

were two ulcers of the legs which took six weeks to heal. Two weeks prior to the onset of the kerato-conjunctivitis of the left eye a small septic spot appeared on the chin. It lasted for a few days. Eleven days after the onset of the eye condition an erythema and mild red papular rash appeared on the left cheek. A little later a much milder papular rash appeared on the right cheek. This condition of the skin was not due to atropine, which continued to be used. The cornea showed several large dots, and a large area covered with pinpoint-like opacities clustered and coalesced in grumous fashion. There was tenderness of the left pre-auricular gland and marked drooping of the left upper lid. The condition of the eye and skin cleared together and he was discharged on the 40th day.

Figs. 6 and 7 illustrate the external and corneal appearance of case 66. Unfortunately, the former does not include the scalp, which became affected with a moist attack of seborrhoea 17 days before the eye condition developed. The upper lid drooped. The pre-auricular gland was not enlarged or tender, not did it subsequently alter. From the beginning the cornea showed peripheral dots and epithelial changes. On the 15th day fine keratic precipitates and faint

aqueous flare appeared. On the 57th day the eye became more red and very painful. The cornea was extremely hazy and showed many folds of Descemet's membrane. The illustration was made on that day. The figure shows that two or three of the peripheral dots had become vascularised, which was unusual in these cases. Some atropine irritation developed, but on the 81st day the eye was completely healed. The skin condition, although improved was, however, still present and the patient was repatriated to the United Kingdom because of its chronicity.

Fig. 8 illustrates the appearance of the cornea of the left eye of case 25 on the 70th day. The condition, which began when the patient was in Liverpool, had already been present for 40 days when first seen in the M.E. The patient stated that small eruptions appeared on his face about the same time as the left eye became painful and red. He had never previously had any skin or eye trouble. When seen here there was a generalised seborrhoea and folliculitis of the face and neck and vestibular rhinitis on the left side. The left cornea in the lower segment showed peripheral scars of healed dots of keratitis. Several of them had coalesced. The most striking feature of the cornea, however, was that almost its entire surface was covered with fine staining pin-points. About the same time the right eye became painful and showed similar but fewer staining pin-points. Ptosis was present and the pre-auricular gland was palpable but not tender. By the 70th day the staining points had become much fewer, as shown in the illustration. It is interesting to note that the final area to be affected was that within the sweep of a trichiatic lash, which occasioned the patient no discomfort. In this case there was again a definite relationship between the varying severities of the skin and eye lesions.

Fig. 9 shows the appearance of case 40. The skin condition of the lid and its margin developed for the first time ten days prior to the onset of eye symptoms. There was a marked thickening and drooping of the eyelid with seborrhoeic dermatitis of the neighbouring skin. The pre-auricular gland was palpable.

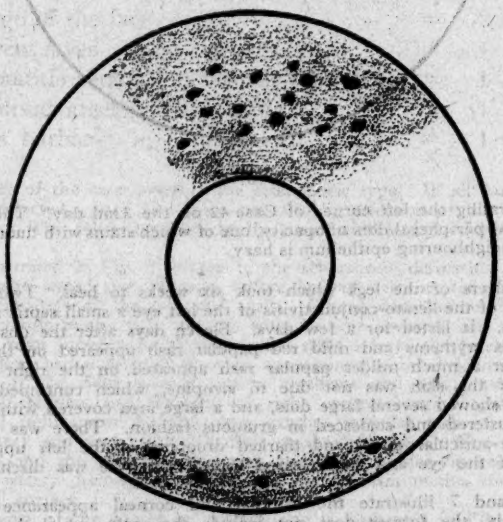

FIG. 10.

Illustrating the right cornea of Case 40 on the 11th day. The darker dots are fluorescein staining.

FIG. 1.

Illustrating Case 42. Erythema and papulation of right forehead; redness and scabbing of right eyebrow region; erythema and fine scaling of right upper lid and outer canthus; papular rash of right cheek. Note the ptosis.

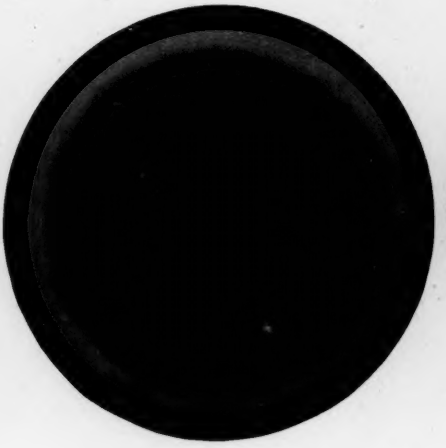

FIG. 2.

Illustrating the right cornea of Case 42 on the 6th day. Superficial flecks of opacity best seen by indirect light and larger dots, several of which are stained with fluorescein.

FIG. 5.

Illustrating the left cornea of Case 35 on the 17th day. Several large corneal dots and a large area covered with pin-point like opacities. The latter are not well seen in the figure.

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FIG. 3.

Illustrating the right cornea of Case 42 on the 11th day Numerous folds in Descemet s membrane and generalised epithelial haze and bedewing

FIG. 6.

Illustrating Case 66. Note the typical ptosis. The affected scalp is not included, unfortunately.

FIG. 7.

Illustrating the right cornea of Case 66, on the 57th day. Note the marked haziness of the cornea and the numerous folds of Descemet's membrane.

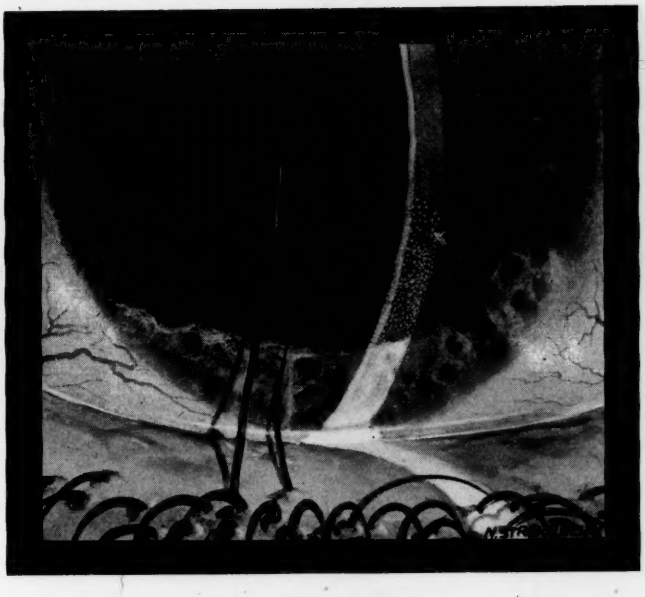


FIG. 8.

Illustrating the left cornea of Case 25 on the 70th day. Note the peripheral scar below in which the coalition of large dots can be recognised. Originally covering almost the entire cornea, the staining points are fewer, but still well seen. The remaining ones are within the sweep of a trichiatic lash.

FIG. 9.

Illustrating Case 40. Ptosis with seborrhoeic dermatitis of the neighbouring skin.

There was a profuse watery discharge from the eye. On the 11th day of the eye condition the cornea showed numerous staining and non-staining dots as recorded in Fig. 10. On the 26th day the eye and skin conditions were healed and all treatment was stopped. Some thickening and drooping of the lid were, however, still present when the patient was examined 14 days after discharge.

The following is an analysis of the space and the time relationship between the skin and ocular lesions in the 18 cases with seborrhoeic dermatitis which are taken as an easily investigated sample of all the cases with skin lesions.

Relationship between the eye first affected and the distribution of the skin lesion in 18 cases of seborrhoeic dermatitis.—In 13 cases where the skin lesion was initially unilateral the ipsolateral eyes were affected.

In the other 5 cases the skin lesion was not confined to one side of the face or head at the time of the onset of the eye condition.

In some cases involvement of the second eye was preceded by spread of the skin lesion to that side.

Time relationship between the onset of the skin lesion and the onset of eye condition in 18 cases of seborrhoeic dermatitis.—In 11 cases the skin lesion preceded the eye condition by an average of 10 days, the longest interval being 17 and the shortest 4 days.

In 5 cases the skin and eye conditions occurred coincidentally. In one case the skin lesion occurred on the day following the onset of the eye condition.

One case (No. 35) must be termed doubtful as although the patient gave a history of a chin sore two weeks before the onset of the eye symptoms he states it lasted only 3 days. As already noted a rash appeared on the face left side 11 days after the eye had become inflamed. It is possible that the original chin condition had not completely healed when he first came under observation for his eye condition because he was not then seen by the dermatologist.

It should be noted regarding the 6 cases in which the skin lesion did not appear to precede the eye condition that in all of them reliance had necessarily to be placed on the patient's statement, and that in at least 5 of these cases a small symptomless skin lesion may well have preceded the eye symptoms by a short interval of time. In many cases a deterioration of the skin lesion was associated with a similar change in the ocular one. From a consideration of these facts there appears little doubt that the lesions of the skin and the kerato-conjunctivitis are closely associated and that they probably form integral parts of one condition. The problem that postulates itself is whether the kerato-conjunctivitis in these skin cases is identical with epidemic virus kerato-conjunctivitis or whether it is a different kind of kerato-conjunctivitis due to a different cause. In the absence of animal

and tissue culture experiments it is proposed to investigate the problem by a close clinical comparison of the group of the 18 cases showing seborrhoeic dermatitis with the group of 33 cases which were completely free of any skin or lid margin lesion and are considered as a control group of epidemic virus kerato-conjunctivitis.

(1) *Seasonal incidence.*—Graph (Fig. 11) shows the monthly incidence of the 33 cases without any skin lesion "control cases"

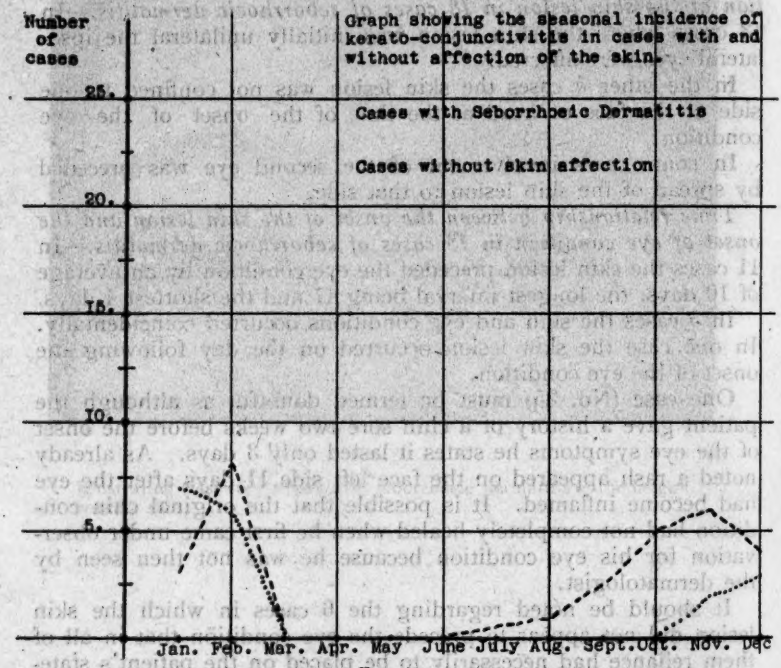

Number of cases
Graph showing the seasonal incidence of kerato-conjunctivitis in cases with and without affection of the skin.
Cases with Seborrhoeic Dermatitis
Cases without skin affection
25.
20.
15.
10.
5.
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec

FIG. 11.

and the 18 cases with seborrhoeic dermatitis. In each instance the condition was definitely more prevalent in winter time, in Egypt the rainy season. It should be noted that seborrhoea is more prevalent in winter.

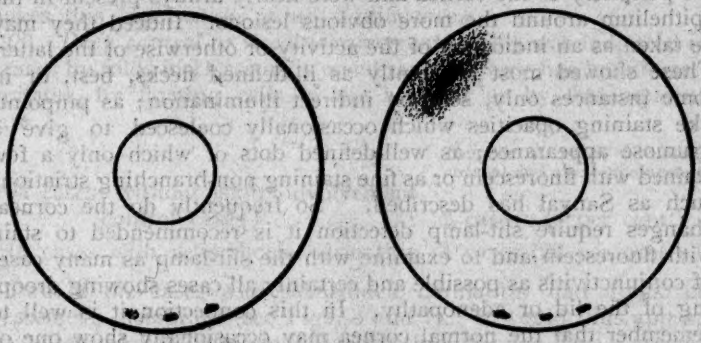
(2) *Bilateral cases.*—In the 33 "control cases" both eyes were involved in 10, *i.e.*, 30 per cent. of cases, while among the 18 cases with seborrhoeic dermatitis both eyes were involved in 11 cases or 61 per cent. of cases. The average interval between the onset in each eye was 10 days in all groups.

(3)

	Duration	*Average*	*Shortest*	*Longest*
33	"Control cases" ...	37 days	8 days	90 days
18	Cases with seborrhoeic dermatitis	46 days	16 days	120 days

(4) *Ptosis.*—This was present in all cases except one of both groups. As Viswalingam has pointed out, the drooping of the lid is present most markedly in the outer 2/3rds of the lid which has the heavy thickened appearance seen with a stye or a wasp sting. The whole thickness of the outer part of the lid appears oedematous in some cases as if there was a tarsitis as well as subcutaneous oedema. Indeed cases 60 and 62 developed a chalazion in that part of the lid.

(5) *Pre-auricular glands.*—In most cases the gland was palpable and tender but taking both groups together in 8 per cent. it was



Day 26 FIG. 12. Day 27

To illustrate Case 63. With the appearance of a large fresh corneal dot, on the 27th day the preauricular gland became much more tender. There was no change in the conjunctiva which had remained white since the 13th day.

enlarged and not tender while in 10 per cent. it was tender but not palpable. These changes occurred as early as the first day. In many cases the enlargement was shotty but more commonly it was diffuse. Variation in tenderness was frequently found to be parallel with variations in the corneal condition. Case 63 showed this in a very marked manner. The conjunctiva became white on the 13th day but the gland remained tender. On the 27th day the tenderness became much more marked coincidentally with the appearance of a large fresh corneal dot, as indicated in Fig. 12. Yet there was no change in the colourless conjunctiva that day except for a mild localised injection close to the fresh corneal lesion. In only one case were the cervical glands involved.

Among the 33 " control cases " the glandular involvement was present in 80 per cent. of the cases.

Among the 18 cases with seborrhoeic dermatitis it was present in 94 per cent. of the cases.

(6) *Conjunctiva.*—In most cases of both groups the conjunctiva showed the red glistening cellophane-like surface seen in cases of epidemic kerato-conjunctivitis together with a watery discharge. In a few cases, particularly of the group with seborrhoeic dermatitis the discharge tended to be muco-purulent. Only 3 cases showed any papillary hypertrophy.

(7) *Corneal lesions.*—These were present in all cases of both groups. As in most of the described epidemics these were very protean. In all cases there were diffuse epithelial changes such as hazing, bedewing, unevenness or fine grey dusting. Often patchy in distribution these epithelial changes tended to encircle within the periphery of the cornea and were nearly always present in the epithelium around the more obvious lesions. Indeed they may be taken as an indication of the activity or otherwise of the latter. These showed most frequently as ill-defined flecks, best, or in some instances only, seen by indirect illumination; as pinpoint-like staining opacities which occasionally coalesced to give a grumose appearance; as well-defined dots of which only a few stained with fluorescein or as fine staining non-branching striations such as Sanyal has described. So frequently do the corneal changes require slit-lamp detection it is recommended to stain with fluorescein and to examine with the slit-lamp as many cases of conjunctivitis as possible and certainly all cases showing drooping of the lid or adenopathy. In this connection it is well to remember that the normal cornea may occasionally show one or two fine staining points which may even be arranged linear fashion and do not wash away with irrigation. If fluorescein is again instilled a few hours later, however, these staining points do not reappear. Tests were carried out on 100 consecutive out-patients attending for visual defects and having no symptoms referable to the cornea or conjunctiva. Of these cases 15 showed the temporary fine pointed staining. There was no relationship betweeen their length of stay in the Middle East and the incidence of these stains. This was further shown by the test being repeated with 36 repatriated allied P.O.W.s within a week of their return to the Middle East from Germany. Five of these cases showed two or three fine temporary staining points.

The larger corneal lesions tended to be peripheral but the faint flecks and points were usually central, in any one case, however, the corneal lesions in their distribution as well as in their type were very frequently mixed.

The following table indicates the frequency of the different corneal appearance among the cases.

	33 cases without skin lesions ("control cases")	18 cases with seborrhoeic dermatitis
Corneal flecks or dots in ...	27 cases (81 per cent.)	13 cases (78 per cent.)
Corneal points in ...	11 cases (33 per cent.)	8 cases (44 per cent.)
Superficial striae in	4 cases (12 per cent.)	no case
Staining with fluorescein ...	22 cases (66 per cent.)	12 cases (66 per cent.)
Centrally placed lesion in ...	14 cases (42 per cent.)	9 cases (50 per cent.)
Peripherally placed lesions in...	26 cases (78 per cent.)	13 cases (78 per cent.)

There is thus no substantial difference between the corneal appearance in each group with the possible exception perhaps of superficial striation. The small number of such cases, however, makes this observation of no significance.

(8) *Deep corneal or uveal involvement.*—This was indicated in 7 cases by folds in Descemet's membrane, by very fine keratic precipitates, by floating cells in the aqueous or by fine aqueous flare.

	Number of cases with deep corneal and uveal involvement
33 cases without skin involvement "control cases" ...	2 cases (6 per cent.)
18 cases with seborrhoeic dermatitis	4 cases (22 per cent.)

Two of the cases with seborrhoeic dermatitis had folds of Descemet's membrane (see Figs. 3 and 7). It would thus appear that cases of kerato-conjunctivitis with skin affection have a greater tendency for the lesion to spread deeply.

(9) *Corneal sensation.*—This was tested in only 13 cases. It appeared to be diminished in two or three of the cases. This small number was not confined to any group.

(10) *Conjunctival smear and culture.*—Because these had, in reported and personal (Feigenbaum, Michaelson and Kornbluth) experiences of epidemic kerato-conjunctivitis, been nearly always negative, routine tests were not done until late in the series. Six of the seborrhoeic dermatitis group examined by smear and culture showed haemolytic staphylococcus aureus. Of six cases without any skin lesion that were examined, four were negative while one showed non-haemolytic streptococcus and one haemolytic staphylococcus aureus. Although the number is unfortunately small it would appear that the staphylococcus aureus is more prevalent in the conjunctival exudate of cases of kerato-conjunctivitis associated with skin lesions than in those not so associated. Indeed because of the near skin condition that is perhaps to be expected.

The use of penicillin drops (250 units per c.c. every 2 hours for 2 or 3 days) was tried in six cases all of whom showed haemolytic staphylococcus aureus. In three of them there were definite lessenings of the patient's discomfort and the amount of discharge from the conjunctiva. It could not be established in any case that the progress of the corneal lesion was affected.

(11) *Non-recurrence.*—Although the period of observation in many cases is short there has been no recurrence in any of the cases of both groups. Not one of the cases, including all of those with skin lesions gave an ocular history in any way suggestive of a previous attack of kerato-conjunctivitis.

Discussion

As the ocular changes in the entire group with skin lesions were similar to those described above in the 18 cases with seborrhoeic dermatitis it may be said that the clinical ophthalmic appearances of the cases with associated lesions of the skin suggested very strongly that they were examples of epidemic virus kerato-conjunctivitis. However, there must be significance in the fact that lesions of the neighbouring skin anticipated or occurred coincidentally with the ocular lesions.

It would appear that lesions of the face and scalp especially those of a seborrhoeic nature may be conducive in some patients in some way to the development of a kerato-conjunctivitis identical with the virus kerato-conjunctivitis occurring in epidemic form, the growing literature on which has recently been fully summarised by Rados. The kerato-conjunctivitis in patients with lesions of the skin is, however, rather more intense as indicated by the greater number with bilateral involvement, adenopathy, and deep corneal spread as well as the slightly longer duration. The certain identity of the kerato-conjunctivitis of these skin cases with epidemic virus kerato-conjunctivitis would require the proof which animal and tissue culture experiments could demonstrate.

It is possible that the virus of epidemic kerato-conjunctivitis can possess dermotropic qualities as do the viruses of herpes simplex and herpes zoster. In this case the lesions of the skin described in the above cases may be considered to be analogous to those found in the skin of patients suffering from herpes simplex and herpes zoster.

The presence of haemolytic staphylococcus in the conjunctiva of several of our cases with skin lesions probably represents an infection super-added, the organism here having a secondary rôle similar to that which it plays in the seborrhoeic infection. It is significant that the use of penicillin in several of our cases did not appear to have any influence on the corneal lesion although it diminished the muco-purulent discharge if present, as well as

the discomfort of the patient. The function of penicillin therapy in these cases would appear to be comparable to its action in the mixed infection complicating that other virus disease of the conjunctiva and cornea—trachoma.

Summary

(1) Thirty-three out of 66 cases of kerato-conjunctivitis seen in one year in the eye department of a general hospital in the Middle East had a concurrent affection of the skin.

(2) Eighteen of the 33 cases had a seborrhoeic dermatitis.

(3) In all cases with skin involvement the scalp or face was affected.

(4) There was a strong tendency for the skin and eye lesions to be ipsolateral.

(5) In the majority of the cases the onset of the skin lesion preceded that of the ocular one by a definite but short interval of time. The evidence in all the others was hearsay obtained from the patient which consisted of the statement that they " began at the same time."

(6) Detailed consideration of the clinical phenomena was made in, and a comparison established between, the 33 cases of epidemic virus kerato-conjunctivitis without skin lesion and the 18 cases with seborrhoeic dermatitis which were taken as an easily investigated sample of all the cases with skin lesions.

(7) This comparison suggests that the kerato-conjunctivitis in the cases with skin lesions was clinically indistinguishable from epidemic virus kerato-conjunctivitis.

(8) The presence of haemolytic staphylococcus aureus in several cases probably represented a mixed infection.

(9) An analogy has been suggested between the skin lesions present in some cases of epidemic kerato-conjunctivitis and those present in two other virus infections of the conjunctiva and cornea, herpes simplex and herpes zoster.

Conclusion

Lesions of the skin of the face or scalp especially those of a seborrhoeic nature are associated in some patients with kerato-conjunctivitis which, on clinical grounds, appears identical with that described as epidemic virus kerato-conjunctivitis. The possible analogous nature of the skin lesions in herpes simplex, herpes zoster and certain cases of epidemic kerato-conjunctivitis has been suggested though by no means proved.

We wish to express our indebtedness to Col. W. B. Stevenson, Commanding Officer of a General Hospital, and to Lt.-Col. G. I. Scott, Adviser in Ophthalmology, Middle East Forces, for their permission to publish this report.

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THE USE OF CRYSTALLINE PENICILLIN IN CORNEAL AND INTRA-OCULAR INFECTION*

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IN a recent review of the literature concerning the use of penicillin in ophthalmology, Rycroft (1945) makes no mention of the direct application of the undissolved salt to the surface of the eyeball. Sorsby (1945) in a similar review does just mention the method, in referring to a paper by Juler and Young (1945) on infective corneal ulcer, but in a recent annotation in the *Brit. Med. Jl.* (1946) entitled "Penicillin in Ophthalmology" no mention is made of this procedure.

From practical clinical experience we feel that this method is worth emphasis, as affording the maximum concentration of the drug in relation to the infection itself.

The method was suggested to one of us (F. A. J.) by Professor Ida Mann (personal communication, February, 1944) who wrote as follows:—"In a small child with a large corneal abscess an incision was made and some crystals of penicillin were put into the cavity. This was repeated twice a day for three days and, although the cornea perforated it healed completely without synechiae and with a scar which was only slightly opaque."

In the report by Juler and Young (1945) the method was described after an extensive trial, chiefly in senile patients with severe corneal lesions.

In that series it was found that the instillation of drops on the cornea did not suffice in the more heavily infected cases, especially in persons of marked senility, and especially where hypopyon was

* Received for publication, February 11, 1946.

associated with secondary glaucoma. In that series the crystalline salt was applied in 12 of these more severe cases; in 6 of these there was no evidence of secondary glaucoma, and no further spread of ulceration; in the other six cases, the ocular tension was increased, further spread occurred in four of these, and a Saemisch section was necessary; after this healing occurred without further spread, and no eye had to be excised.

It has now been used in a number of infective processes and some case reports are given below.

In spite of the impurity of the present penicillin products, no harm seems to have accrued to the human eye from the applications of crystals to a surface ulceration or to an open wound, with the following exception :—

In a case of hypopyon ulcer associated with post-herpetic anaesthesia of the cornea some further loss of epithelial surface followed the application, but under a temporary lid suture, repair was soon made good, the infection having been stopped.

The infective processes which have derived benefit are as follows :—

Infective ulceration of the cornea, the deep recurrences of rosacea keratitis, infections through the filtration scar of a trephine operation, infections of perforating wounds and intra-ocular operations.

The crystals used have been those of sodium penicillinate. After instillation of decicain and (if thought necessary) orbital injection with 4 per cent. procaine, a minute amount is applied to the infected area, allowed to stand and dissolve, the while it is gently rubbed into the tissues. It is important to emphasise that it be rubbed well under any advancing edge of ulceration, and into any infiltration.

Pain is variable and sometimes severe. Up to date we have not repeated the applications more frequently than on alternate days, but as in Ida Mann's case, it may be possible to use it at shorter intervals.

Experimental work on aqueous content of penicillin, quoted by Rycroft (1945) and Sorsby (1945), has shown that in the absence of corneal epithelium penetration of the drug into the anterior chamber does occur from surface drops. It would seem reasonable to assume, therefore, that through a thin trephine bleb or an open wound a valuable concentration into the aqueous fluid would occur from crystalline application to the surface.

Whether such a diffusion takes place into the vitreous from a similar application, is a matter for further research. If it can be shown to occur the method will be less damaging to the eye than the introduction of fluid penicillin by means of a syringe into the vitreous body itself, which has been shown to be definitely harmful.

The following case reports seem worthy of record :—

CASE 1.—Mrs. H. N., a housewife, aged 50 years, was seen in the Out-patient Department with a central corneal ulceration of approximately 3 mm. diameter and a small hypopyon. Vision was C.F. at ½ metre.

The following day she was admitted to hospital and as much solid sodium penicillin as could be balanced on the grooved end of a silver probe was applied to the ulcer of the cocainised eye. By means of an iris repositor the ulcer was carefully curetted, especial care being taken to rub the penicillin beneath the undermined advancing edge of ulceration; the solid penicillin dissolved rapidly.

One drop of 1 per cent. atropine was instilled and a pad and bandage applied for 6 hours. Afterwards 1 drop of solution of 500 O.U. of penicillin was instilled, hourly by day and two hourly by night—care being exercised to place the drops on the top of the cornea with the patient looking down. Atropine 1 per cent. was instilled into the conjunctival sac thrice daily.

The following day a definite improvement was noted and a further advance of the ulcer arrested. On the 3rd day the hypopyon was cleared and the ulcer had begun to epithelialize. The patient was discharged on the 9th day with the cornea firmly healed and the eye whitening.

CASE 2.—Mr. McR., an alcoholic, aged 52 years. This man's only eye, two days after an intracapsular lens extraction, became congested, with corneal oedema and much muco-purulent discharge, which contained staphylococcus aureus.

500 O.U. of penicillin in 0·5 c.c. of distilled water were injected into the anterior chamber, and a course of 25,000 O.U. of penicillin was commenced subcutaneously, at 3 hourly intervals for four days.

Within 12 hours the eye was definitely worse and there was a complete hypopyon; the next day crystals of solid penicillin were applied under the conjunctival flap. A definite improvement was noted the next day when the application was repeated. Two days later, a paracentesis of the anterior chamber was performed, to diminish the raised intra-ocular tension. Eight days from the first application of penicillin crystals the eye began to whiten.

When the patient was discharged a fortnight later he had 4/60 vision and was able to read J.10 with +10.D.Sph. Six months later he had 6/9 with suitable correction.

CASE 3.—J. S., aged 34 years, had a hypopyon ulcer treated elsewhere with local applications of penicillin drops and penicillin systemically; despite treatment the whole anterior layers of his cornea necrosed.

The same routine of treatment as in case 1 was repeated and within 24 hours a definite improvement was noted. Within 8 days his eye had begun to whiten and the hypopyon cleared completely. Unfortunately, the condition recurred within 3 weeks, possibly

due to too early discharge from hospital; the whole eye became a suppurating mass, and subsequently had to be enucleated.

CASE 4.—J. S., aged 48 years, had a trephine operation three years previously for chronic glaucoma.

Ten days prior to admission to hospital his eye became inflamed and tender with the vision diminished to perception of light only. There was much exudate in the anterior chamber and a small hypopyon below. Bacteriological examination revealed infection with the staphylococcus aureus.

Solid penicillin was applied to the trephine bleb above, and the next day 500 units of penicillin in ½ c.c. of saline were placed in the anterior chamber. Conjunctival penicillin drops were administered hourly by day and two hourly by night for 5 days.

The following day the hypopyon had diminished and the eye had begun to whiten but a remarkable feature was the exceptionally low ocular tension which was still observed when the patient was discharged from hospital after ten days, with his eye whitening and considerably improved.

When seen in the Out-patient Department later his eye was quiet and the vision was 6/24 partly, almost as good as 3 years previously after the trephining operation. The tension was inclined to be full.

CASE 5.—S. D. was an identical case to the one above, only with a diphtheroid infection, and was treated along exactly the same lines. Again—after the infection had begun to subside an exceedingly low ocular tension was noted but within one month it had returned to normal and the infection completely subsided.

The vision had returned to counting fingers at 1 metre, whereas previously it had been bare perception of light.

We have permission to copy a report by Professor Ida Mann to the Penicillin Trials Committee in 1944 as follows:—

"Eight eyes with corneal ulcer were treated with penicillin ointment and in addition the surface of the ulcer was massaged with solid 290 unit penicillin applied with an iris repositor. Five healed with no other treatment. One only had hypopyon and had atropine in addition; this also healed. The remaining one (2 eyes) was a case of Mooren's ulcer and showed no improvement.

In some of these cases the penicillin massage was applied several times at 24 hourly intervals; in one case it was applied daily for eleven days, after which healing occurred "leaving a remarkably transparent scar."

Summary

Clinical experience in the application of crystals of penicillin to the cornea in infected ulcers, filtration scars and wounds is reported upon favourably. No evidence of harm to the tissues has been seen. Case records of typical cases are given.

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ADDENDUM

The Use of Solid Penicillin in a Case of Endophthalmitis following Lens Extraction

BY

D. AINSLIE, M.B., B.Ch., D.O.M.S.

The patient was a man, aged 61 years, who underwent left lens extraction on November 16, 1945, at Moorfields Hospital.

The immediate post-operative course was uneventful, but the section did not close completely at first and gaped slightly for about ten days.

On the 8th day after the operation the cornea became hazy and a 3 mm. hypopyon developed.

Solid penicillin powder (calcium salt) was applied to the line of the section, the total amount being about 20,000 units. The next day the hypopyon was reduced to 1 mm. and the following day the cornea was again clear and there was no hypopyon.

Mild iritis persisted for about 10 days after which time the patient was discharged in a satisfactory condition, the eye being quiet, with normal tension, thickened capsule and good projection of light.

AN OPERATION FOR POSTERIOR ROUTE EXTRACTION OF INTRA-OCULAR FOREIGN BODIES*

BY

L. B. SOMERVILLE-LARGE

DUBLIN

RECENT ophthalmic literature has been flooded with the intra-ocular foreign body and its ramifications in relationship to ophthalmic war surgery. It would appear, however, from a study of the literature that the operative procedure for extraction by the posterior route has universally followed an approach advocated first, I think, by H. B. Stallard. The object of this article is to describe a method of posterior route extraction that I have been carrying out while in

* Received for publication, February 4, 1946.

the army during the last few years but that has not, as far as I am aware, been previously suggested. Force of circumstances has often compelled a new method of carrying out a recognised procedure. In the method to be described the force of circumstance was a 6½ mm. length of wire in the vitreous combined with the absence of scleral sutures, diathermy and giant magnet. The success of the resulting procedure induced me to employ a somewhat similar operation in twenty-four intra-ocular foreign bodies (battle casualties and accidents) that I subsequently operated on by the posterior route.

There are three essential differences from the recognised procedure in the operation to be described. The sclera is opened with a trephine, the diathermy coagulation of the choroid is limited to the area of the trephine hole, no scleral sutures are used.

Localisation.—This was carried out by means of the limbal ring X-ray and need not be mentioned in detail as the method used differs little from that already described by others. One antero-posterior and two lateral exposures are taken. The two lateral exposures are made on the same plate, in one of these with the eye looking up and in the other with it looking down. This procedure calls for absolute fixation of the head. As most of the patients were Indians in whom concentration is normally limited to a few seconds an apparatus for fixing the head had to be devised. This was splendidly carried out to the design of Lt. Col. Lawlor, Adviser in Radiology, S.A., India. By means of this rest and with the head clamped the eyes can be directed, and their position observed, by an assistant. Thus rotation and fixation can be assured. The antero-posterior film shows the foreign body in relation to the perfect circle of the limbal ring, and the lateral film shows it in relation to the two rings here seen as lines and almost at right angles to each other with their apices touching. The external diameter of the ring is measured before it is sutured on the limbus. By taking into consideration the difference between this diameter and the diameter of the ring on the X-ray plate exact distances on the latter can be calculated and the position of the foreign body from the ring obtained. As other writers have emphasized it is essential that the ring be a good limbal fit and be sutured firmly in position in exact relationship to the limbus. It must also be emphasized that this method of localisation becomes therefore an operative procedure, and it is often made more definitely so in a severely injured or inflamed eye.

The magnet used for this operation was made in the Indian Institute of Science, Bangalore, from the diagram illustrated in the Medical History of The War, 1922, Vol. 2, page 523. (I am much indebted to the ophthalmic compilers of this volume whose detailed instructions greatly simplified this work). The only fundamental

difference was in the construction of a special point tapered to 1½ mm. This magnet had a stronger pull than a Haab (in the Minto Eye Hospital, Bangalore) and also than the army magnet that arrived some twelve months later. All magnets were tested through their strongest points. The magnet stand was manufactured in the workshops of H.E.H. The Nizam's State Railway, Hyderabad, to the design of its principal, Mr. Ottman (to whom for this and other beautifully executed work I am profoundly grateful). The design is almost exactly similar to that described and illustrated by Lt.-Col. Rycroft. The arm suspending the magnet moves horizontally on ball bearings, and the magnet itself can be raised or lowered on a counterweight which is kept somewhat heavier than the magnet to eliminate the danger of the point being pressed against the globe during the operation. When in use the magnet is wrapped in sterile towels and is manipulated by the surgeon who, while sitting behind the patient's head and allowing fixation of the eye to be carried out by an assistant, can use both hands for the purpose. Thus complete manipulative control of the magnet is readily obtained.

Operation.—As the majority of patients were Indians, from whom co-operation was uncertain, a general anaesthetic was employed. This normally consisted of induction by pentothal followed by intra-tracheal gas and oxygen. Vomiting occurred in one case but was mild and caused no complications.

The operation is carried out with the surgeon seated behind the patient's head. An ample conjunctival flap is cut from before backwards and the episclera completely removed from the trephine site. Conjunctival sutures for the re-apposition of the flap are inserted. A fixation suture is placed through the sclera 2 mm. from the limbus at the apex of the flap. If necessary in order to expose the operation site one of the recti is divided and the distal end retained by a mattress suture. The magnet is now manipulated into exact position in relationship to the area of the sclera to be trephined and then swung away from the operative field. Thus it can be brought back to the correct position immediately it is required. The sclera over the area that is estimated as nearest to the foreign body is trephined with a 1½ mm. trephine. The base of the disc is dissected off the choroid using sac knife and disc forceps and taking great care that the choroid is not injured. The choroid is then coagulated through the trephine hole using the sharp point of the diathermy. Now the magnet is swung into position and the tip of the 1½ mm. point made to enter the trephine hole. The power is switched on for periods of 2-4 seconds. The magnet point must be repeatedly withdrawn while the current is on as the foreign body cannot be seen coming to it. It is unusual to see any bulging of the surrounding sclera before the foreign body makes contact with the magnet point. There may

FIG. 1

Head rest for scleral ring X-ray. Patient shown in position for lateral exposures of left eye. The left side of the face is pressed against the film which is held between the lower horizontal bars. For the right eye the patient sits facing the opposite way.

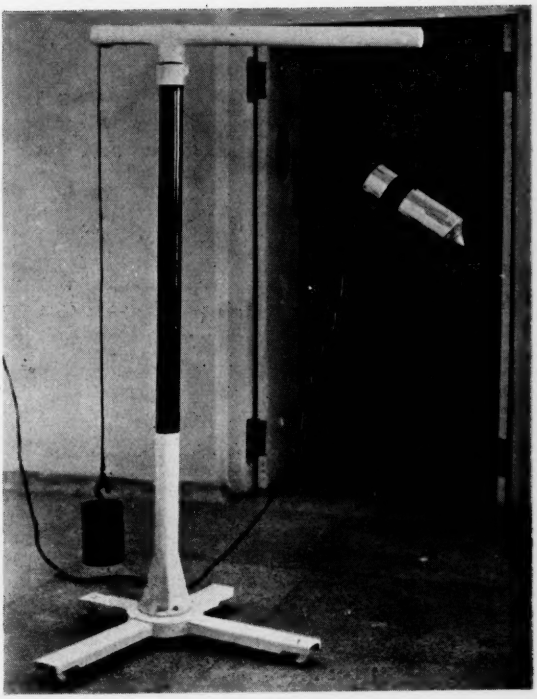

FIG. 2.

The giant magnet and stand. To avoid obstruction the two legs not under the operating table are shortened. Stops prevent the magnet being swung over these legs. The magnet point illustrated is not the special fine one terminating in 1½ mm.

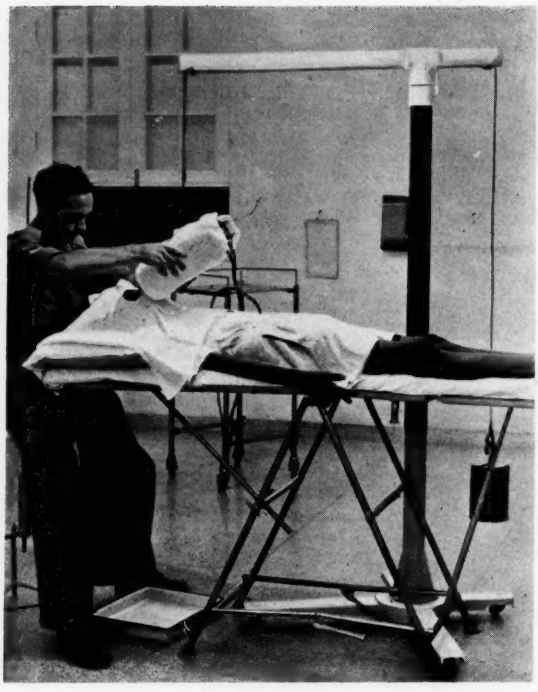

FIG. 3.

Illustrating position in which magnet is held during operation. The magnet stand should be on the side of the table corresponding to the eye being operated on, the anaesthetic apparatus being on the other side.

be some traction on the tissues as the foreign body comes through the hole. If bulging does occur, or the foreign body is not easily delivered, the trephine hole should be enlarged by a radial incision made through the sclera with a sac knife over the area of the bulge. This procedure is simple and has never failed to render the foreign body easy to remove with but slight traction on the parts. In this series of cases it has, however, seldom proved necessary. If the foreign body does not come to the magnet point when this is in the primary position of right angles to the globe the point must be moved to the 12 o'clock, 3 o'clock, 6 o'clock and 9 o'clock meridians. In each of these positions the power is turned off and on many times. The foreign body can often be delivered by these manoeuvres when the primary position has failed. When no pull resulted from the foreign body with the 1½ mm. point one of the stronger and blunter points was tried. These never succeeded where the finer point had failed. This would appear to suggest that the finer point is brought by this operation so near the foreign body that a stronger point, which by its thickness is of necessity at a greater distance, fails to exert under these conditions a stronger magnetic pull. It was my practice to apply the magnet for a total of 15 mins. before deciding that the foreign body was either non-magnetic or too embedded to be removed. By this time the heat of the magnet was such as seriously to diminish its power. The muscle suture (if a muscle was divided), followed by the conjunctival sutures are then tied, penicillin and atropine are instilled and both eyes bandaged.

After treatment.—Both eyes are kept bandaged for six days. Atropine is instilled after the second day. The patient is allowed up on the tenth day.

Post-operative results.—This operation was carried out twenty-four times. Twenty-two of these cases had been admitted from forward areas and had already passed through two or more hospitals. In none of the twenty-two was this operation carried out until after two months from the time of the injury, and in three the foreign bodies were successfully removed on the 108th, the 246th and the 369th day respectively. In no case were there any post-operative complications. In eight only was the foreign body visible in either vitreous or fundus. In seven the foreign body was removed. In no case was any choroidal or retinal haemorrhage observed post-operatively, nor did fresh vitreous opacities or a recognisable increase in previous vitreous opacities occur. The post-operative choroido-retinal scar was observed in seven cases, in four of these after the foreign body had been removed. This scar was surprisingly small being nearer one quarter than one half a disc diameter.

In the absence of a diathermy apparatus the choroid can be scarred through the trephine hole with the actual cautery. This was

done in the case where a 6½ mm. length of wire was present in the vitreous. A 2 mm. trephine was used and the cautery applied directly to the exposed choroid through the hole. The wire was then withdrawn with a hand magnet. The resulting scar was little more than a quarter of a disc diameter. No fundus haemorrhages or vitreous opacities were produced. This eye was seen eighteen months after operation and the vitreous had remained clear without the production of retinitis proliferans.

The operation can be carried out on the posterior pole of the eye. In one case a foreign body caused by a hand grenade wound could be seen embedded in the fundus less than two disc diameters below the macula. It had been reported " non-magnetic to magnet test." The external and inferior recti were divided. After trephining and diathermic choroidal coagulation the foreign body was easily delivered with the 1½ mm. point of the giant magnet. The periphery of the resulting choroidal scar was seen to overlap the site where the foreign body had been embedded. The operation was carried out 246 days from the date of the wound. No fundus haemorrhages or apparent increase in existing vitreous opacities occurred.

When considering this operative procedure the question must immediately suggest itself " Was not vitreous lost through the trephine hole?" This is an astonishingly difficult question to answer. The vitreous face must be broken in most cases with subsequent tendency for the vitreous to follow the foreign body out of the eye through such a relatively large opening. In two cases only could I be sure of the loss of any vitreous-like substance. In these a thin " watery vitreous " followed the foreign body but as in these cases there were dense pre-operative vitreous opacities obscuring all fundus details the post-operative choroidal result could not be ascertained. No untoward result appeared to occur in either case and the post-operative tension was normal when taken on the tenth day. I do not consider vitreous loss to be a complication of this operation.

Advantages.—It is realised that to advocate any operative procedure on such a small number of cases is unjustifiable. Few surgeons, however, are called upon to remove more than a limited number of foreign bodies by the posterior route so that any simplifying of the operation compatible with safety and minimum trauma is worth suggesting.

It would appear reasonable from the above to claim the following advantages for this operation.

1. The apposition of a powerful magnet point as near the foreign body as is compatible with safety.
2. The production of a minimum choroidal scar.
3. The absence of post-operative fundus haemorrhages and vitreous opacities.

THE TREATMENT OF TRACHOMA*

BY

E. O. MARKS

BRISBANE

MR. ARNOLD SORSBY'S article on the treatment of trachoma in the February (1945) number is of the utmost interest to all who have to deal with the disease, and should give rise to a wide discussion of the subject. In the hopes of such a discussion the following is contributed.

Over the last twenty-five years in Brisbane, at the Hospital for Sick Children and at the Wilson School Ophthalmic Hostel I have had the care of trachomatous children who come from the dry inland areas of Western Queensland where trachoma is prevalent. In those areas the dryness of the atmosphere, the dust, and the glare combine to form very irritating conditions for the conjunctivae, with a consequent common irritative conjunctivitis. Flies are very bad at some seasons, and epidemics of acute conjunctivitis are then common, especially in the less hygienic sections of the community. Follicular conjunctivitis and spring catarrh are as common there as elsewhere, and there is trachoma. However, most people in our " West " have lids and conjunctiva which compare well with those of dwellers in the more humid portions of the state, where trachoma is rare.

The first difficulty in any particular case is to decide whether the child has trachoma or one of the other varieties of conjunctivitis. In a typical case with characteristic signs all would be agreed on the diagnosis, but there are many more milder cases of chronic conjunctivitis with somewhat roughened or velvety lids and varying degrees of thickening and varying amount or character of " granulations " in which the diagnosis can only be a matter of pious opinion on which experienced practitioners could reasonably disagree. I have seen many cases called trachoma by others in which I was confident the diagnosis was incorrect, and some in which the rapid recovery showed my own diagnosis to have been at fault. Most that I had regarded as " doubtful " trachoma showed by their progress that the doubt was justified.

In 1919 I had the privilege one day of going with the late Mr. Treacher Collins to see the Trachoma school at Swanley. From what I remember seeing then, most of the cases were mild and many of them would now make me doubt the certainty of the diagnosis. I can remember hearing a discussion about that time between two senior men at Moorfields as to whether or not a patient

* Received for publication, October 3, 1945.

had trachoma and they decided to refer the case to Treacher Collins for decision.

This is all mentioned to emphasise the difficulty of diagnosis, and that the results of treatment of trachoma must in the first case depend on the standard of diagnosis and in the second case on the standard of cure, a matter of no less difficulty.

It is an old medical adage that, where there are many cures for a disease, it is either incurable or gets well itself. The cures for trachoma have been legion, does the adage apply ? Since individual patients differ in the severity of the disease, in their resistance to it, in their response to treatment, and since also there may be a climatic, a seasonal, a racial or a geographical variation in its virulence, it is very difficult to draw satisfactory conclusions from the results of any particular treatment. There is also a fallacy not always borne in mind that a rapid improvement usually takes place in the first few weeks in an institution no matter what treatment is given, due no doubt to the improved general and ocular hygiene and diet.

In an endeavour to determine the relative merits of different local treatments I have at various times tried running tests of about five cases, treating the right eye one way and the left another in all five, choosing cases in which the two eyes appeared to be equally affected. This differential treatment was usually continued for three months or more. With perhaps the exception of the sulphonamide drugs my results fully confirmed the old adage. It does not matter what one applies locally, apart from lavage to keep the eye clean. Time and the general health are the cure, particularly time. It is years since I have painted a lid with silver nitrate or used copper sulphate. Milder things are every bit as good or better, being possibly less harmful and certainly less unpleasant for the patient. Expression, where there was anything to express, seemed to make an immediate improvement but did not hasten the final cure.

My impression of the sulphonamide drugs is that, administered orally they are wonderful in dealing with the secondary infections but do not deal with the trachoma. They seem less efficient in local application. Prontosil and soluseptasine as drops did not seem to have much effect but sulphanilamide powder which remains in or clings about the eye for a long time does seem to benefit many though not all eyes, in comparison with the other eye as a control. But it is not a miracle worker. War conditions have latterly interrupted the supply of patients, and we have not had any severe cases to justify the use of penicillin since that drug has been available. The absence of these severe cases gives rise to the hope that the virulence, if not the prevalence, of the disease is diminishing.

Generally, my impression is that the milder the treatment of

trachoma the better, and most children for some time have only had boracic lavage followed by a drop of ½ per cent. zinc sulphate. The latter is perhaps a pandering to convention. The case for which the Wilson Hostel received the most gratitude was a small girl from central Australia who had been under treatment for a long period in hospitals in two of the southern capitals. When she arrived she had photophobia and blepharospasm and it was very difficult to see her cornea which had pannus and some ulceration. She was so miserable and unhappy that I said not to worry her for a few days with anything but boracic lavage and atropine. She improved so rapidly and continuously that at no time was other treatment desirable, and boracic was all she ever got. Whether the child had an idiosyncrasy to drugs previously used, or whether she happened to come at the time she was going to get well in any case, the fact remained that she actually did wonderfully well with simple boracic lavage and the absence of chemical irritants. That was before the advent of sulphonamides.

To conclude, the main object of this communication is to enquire if others have tried the experiment of treating the two eyes differently, and if so, their findings.

SCHISTOSOMIASIS OF THE CONJUNCTIVA*

BY

GAMIL BADIR

ASSISTANT PATHOLOGIST, MEMORIAL OPHTHALMIC LABORATORY, GIZA, CAIRO, EGYPT

SCHISTOSOMIASIS of the conjunctiva, as any extraperineal schistosomiasis, is very rare in relation to the big number of patients affected with bilharzia in Egypt.

In 1944, only one case of bilharziasis of the conjunctiva was examined pathologically at the Memorial Ophthalmic Laboratory.

In 1945, up to August, only one case (the present one) has been examined pathologically at the laboratory.

This relative rarity may be due to one of two reasons or to both:—

1. Infection with bilharzia through the conjunctiva is actually exceptional.

2. Bilharzial affection of the conjunctiva passes unnoticed by the patient until cured concomitantly with the urinary affection under specific treatment.

The first case of schistosomiasis of the conjunctiva observed was that of Sobhy Bey in 1927. The patient was a boy aged 8 years.

* Received for publication, December 6, 1945.

The affection was a swelling of the palpebral conjunctiva of the right upper lid, extending to the upper and outer part of the bulbar conjunctiva and the upper part of the limbus.

The second case was examined in 1933 and described in the Annual Report of the Memorial Ophthalmic Laboratory. The patient was a girl aged 12 years. The affection was a pinkish swelling arising from the left plica semilunaris.

The third case occurred in 1936 and was decribed in the Annual Report of the Laboratory. The patient was a girl aged 12 years. Several small yellowish masses were present under the conjunctiva near the left upper limbal margin. They had the size of a pin's head and resembled streptothrix nodules.

The fourth case occurred in 1938 and was described in the Annual Report of the Laboratory. The patient was a boy aged 12 years. A flat yellowish pink mass occupied the region between the inner margin of the limbus and the semilunar fold of the right eye and extended upwards into the fornix.

Then Dr. Ahmed Kamel reported and described four cases, one occurring in 1939 and three in 1941, in a paper read at the Annual Congress of the Ophthalmological Society of Egypt in March, 1943.

Finally, a case was examined pathologically at the Memorial Laboratory in 1944. The patient was a boy aged 10 years. The bilharzial lesion was a swelling in the left upper palpebral conjunctiva including the upper fornix; it was adherent to the tarsus, semisolid and sessile.

All the above nine cases occurred in children, 7 boys and 2 girls, aged from 5 to 12 years.

Pathological examination of all the above specimens revealed the presence of bilharzia ova only in the granuloma. The presence of the worms could not be detected. The ova in all the specimens were terminal-spined (B. haematobium).

The presence of the adult bilharzia worms in the conjunctival lesion or in its neighbourhood was suggested by Sobhy Bey and by Ahmed Kamel.

Sobhy Bey says: " Il est plus que probable, d'après l'étendue de la lésion et le grand nombre d'oeufs trouvés dans les préparations que les vers bilharziques ne se trouvent pas très loin de là ou, en d'autres termes, que les vers sont logés dans les veines orbitaires ou sous-conjonctivales et peut-être dans la partie de la tumeur enlevée."

Ahmed Kamel lays stress on the " recurrence of the lesion in the same locality (conjunctiva) after removal when patient did not receive general treatment " and says " this point is in favour of the great probability that the adult worms are present in the vessels of the vicinity of the conjunctiva."

FIG. 1. (×40)

The epithelial lining of the region of the caruncle is thinned. Groups of terminal spined Bilharzia ova are seen lying in the subepithelial tissue and forming pseudo-tubercles. Few ova show calcium deposit in the contents of their shells.

FIG. 2. (×96)

A high power view of Bilharzial pseudo tubercle showing a group of ova cut in different directions. The ova are surrounded by epithelioid cells and an outer zone of lymphocytes and plasma cells.
To the left hand side of the photograph an ovum shows the terminal position of the spine.

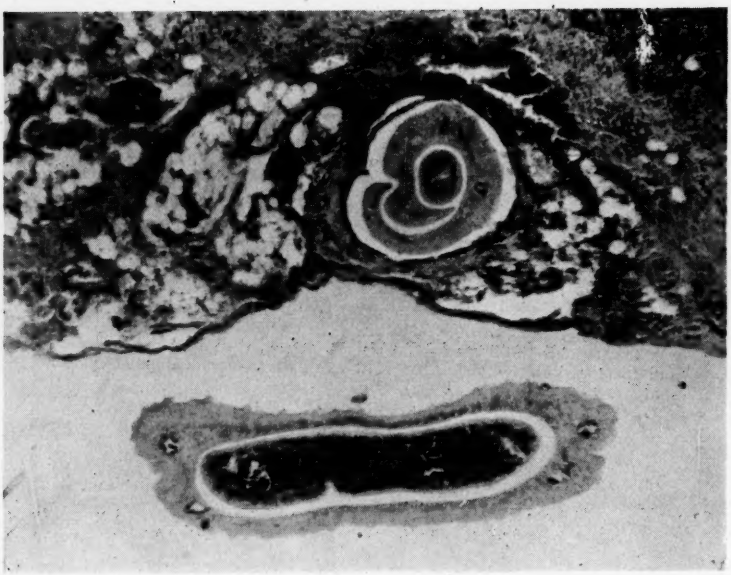

FIG. 3. (×40)

Male and female Bilharzia worms are seen lying in a dilated orbital vein. Deeper, lying outside the tissues, the same worms are seen in tangential section.

Consequently, I endeavoured to search for the adult worms in the specimens of bilharzial granulomata submitted to me for pathological examination at the Memorial Laboratory, Giza.

I was fortunate to find the adult worms in the following case which I am going to describe and is very interesting in view of the fact that it is the first case reported where the worms were observed *in situ* under the conjunctiva.

Description of the case

On May 16, 1945, a boy aged 12 years, presented himself to Dr. Ahmed Farouk, Ophthalmic Surgeon at the Fouad I. Ophthalmic Hospital, Alexandria.

On examination, Dr. Farouk found a tumour of the palpebral conjunctiva of the left upper eyelid near the inner canthus. Patient had T.3 in both right and left lids; both corneae were clear. Patient stated that the tumour was present for more than a month.

The swelling was excised on May 17, 1945 and submitted to the Memorial Laboratory for pathological examination, with a provisional diagnosis of " ? Hypertrophied Tarsus."

The specimen was embedded, as usual, in paraffin and was submitted to me for examination on June 3, 1945 (Lab. Report No. 283/1945).

Pathological description of the specimen

The specimen consists of a portion of the fornical conjunctiva together with a granuloma in the region of the caruncle.

The fornical conjunctiva shows a cicatrising trachoma with pseudocysts (T.3); about four trachoma follicles are also seen (T.2a). A piece of a serous gland (accessory lacrymal gland, most probably) is shown under the conjunctival epithelium amongst the fibrous cicatricial tissue.

Gradually the epithelium merges into the stratified epithelium covering the region of the caruncle. There, the epithelium is thinned out and infiltrated with migrating cells. It is ulcerated in a large portion of its extent and bilharzia ova are seen making their way through this ulcerated area to the surface.

Just beneath the epithelium, and extending deep into the tissues in the region of the caruncle, lies an inflammatory granuloma containing a large number of terminal-spined bilharzia ova arranged in groups and surrounded by tuberculoid nodules of various sizes. These nodules are composed of epithelioid cells with an outer zone of lymphocytes and plasma cells (Figs. 1 and 2.) Eosinophils are present everywhere in great numbers; they are massed together in places (Schistosomal pseudo-abscess).

Many of the ova are degenerated having only their distorted shells which are either empty or contain a collection of piknotic,

necrotic cells. A few ova show calcium deposit in the contents of their wrinkled shells.

A few giant cells are seen surrounding the degenerated ova, others are lying amongst the cells of the granuloma away from any ova. In other places, a marked fibroblastic reaction is present surrounding the degenerated ova.

The terminal position of the spine is well shown in the majority of the ova. Others are cut transversely or obliquely and show as rounded or oval spaces.

The granuloma occupies all the region of the caruncle and extends deeply into the connective tissue and fat reaching the tissues of the orbit.

There, a male and an included female bilharzia worms are seen in cross section, lying in a dilated orbital vein (a branch of the superior ophthalmic vein). The vein is surrounded by the fibro-fatty tissue of the orbit which is infiltrated with plasma cells and lymphocytes. There is no endophlebitis (Fig. 3).

The male worm bears prominent, cuticular, wart-like papillae on the outer surface of its body; the borders of its gynoecophoric canal are overlapping. Its intestinal branches are shown in cross sections.

The female lies in the gynoecophoric canal of the male; it is rounded in cross section: Its cuticle is smooth and in its body cavity we can see the intestinal caeca distended with deeply staining material and a cross section of the yolk gland.

Deeper to that, lying outside the tissues, the male and enclosed female worms are seen in tangential section. The cuticular papillae on the outer surface of the body of the male worm are more markedly shown. The female shows its intestinal canal distended with deeply staining material. It is probable that the worms have been squeezed out of the vein during excision of the tumour.

Unfortunately, I could not have the patient at the Laboratory to complete examination. He could not be found in spite of the repeated efforts of Dr. Farouk.

It would have been interesting to know whether he had a concomitant urinary bilharzial infection and to exclude such congenital anomaly as the presence of a patent foramen ovale. It would have been interesting also to examine him for another extraperineal (or systemic) bilharzial affection, to examine his lungs and to note the result of specific treatment on the conjunctival granuloma.

How do the Bilharzia worms reach the conjunctival tissue?

Before describing the life history of the parasite, it is interesting to note the following:—

The *ovum* of bilharzia haematobium measures 110 to 120 u. in length and 46 to 50 u. in breadth.

The *cercaria* (schistosomulum) of the same worm measures 170 u. in length (without the tail) and 57 u. in breadth.

The *male* worm measures 11 to 18 mm. in length and 1 mm. in breadth.

The *female* worm measures 20 mm. in length and 250 u. in the broadest middle portion of her body.

The *blood capillaries*, including the capillaries of the lung, vary in size, averaging 8 to 10 u. in diameter.

" In man, in the eyelids, the terminal ramifications of arteries connect with the veins not only by ordinary capillary network but also by direct arteriovenous anastomosis " (Maximow).

Now let us consider briefly the life history of bilharzia haematobium.

The ova are voided by the patient with the urine. If voided in fresh water, the miracidium hatches and is attracted towards the intermediate host, a fresh water mollusc of the genus bullinus. In this host, the miracidium develops into the primary sporocyst and secondary sporocysts. Cercariae are produced in the interior of the secondary sporocysts. The cercariae, when fully mature, break through the sporocyst wall and bore their way through the tissues of the snail into the surrounding water.

This is the stage of development outside the body of man, the definitive host.

Then comes the next stage, *i.e.*, penetration of the cercariae through the skin or mucous membrane of man and migration of the cercariae (now called schistosomula) inside the body of the definitive host. Opinions vary as to the exact route followed by the schistosomulum to arrive at the bladder which seems to be the normal goal of the mature worm. The possible routes are the following :—

1. From the lymphatics and veins of the skin or mucous membrane to the right side of the heart, then through the pulmonary artery, to the lungs. From the lungs they pass through the pleura, mediastinum or diaphragm and penetrate into the liver; then they go to the portal vein where they mature in 2 months, copulate and pass into the branches of the mesenteric veins to the bladder to deposit their ova. The ova are voided with the urine and thus the cycle is complete.

2. From the lungs instead of going directly to the liver through the diaphragm, *they pass through the lung capillaries* by the pulmonary vein, to the left side of the heart and then to the systemic arterial circulation. Thence some of the schistosomula pass *through the capillaries of the gastro-intestinal canal* to the mesenteric and portal veins where they attain maturity.

This route can be at once excluded for the simple reason that the schistosomula are 57 u. in breadth while the lung capillaries and

the capillaries of the gastro-intestinal canal have a diameter averaging between 8 and 10 u.

3. The third possible route is that supported by Diamantis who states that there is no necessity for a hepatic stage for bilharziasis in man and that the cercariae develop to maturity and pass their eggs in the veins directly subjacent to the skin or mucous membrane through which they have penetrated if the conditions are favourable for their development, *i.e.*, if the part is richly vascularized. The cercariae (schistosomula) pass their incubation period in the veins of the diseased organ.

If the first route is the usual one in cases of ordinary infection of the bladder with bilharzia haematobium, the third route, though exceptional, is not impossible and it explains the cases of extravesical bilharzial infection, *e.g.*, those occurring in the conjunctiva, and the case of the water-carrier who developed a bilharzial granuloma of the skin of the back at the site where he carried his goatskin (case reported by Bilharz and quoted by Sobhy Bey). In both these examples of probable direct infection, the conditions were favourable for the development of the worms, the parts being richly vascularized due to trachoma in the conjunctival group of cases and to irritation of the skin in the case of the water-carrier.

Direct infection through the conjunctiva is rendered possible by bathing in infected water; this is conceivable as it is a common habit of children to bathe in pools and shallow waters where the infected snails abound. As already stated, all the cases with conjunctival bilharziasis reported are aged between 5 to 12 years including the present case.

It remains to consider the possibility for the adult worms to pass from the portal to the systemic circulation through the big anastomotic veins between the two systems.

The worms pass through the inferior vena cava into the right side of the heart. From there, there are three possible ways for the worms to reach the conjunctiva:—

1. From the right auricle, against the blood current, into the superior vena cava then to jugular vein and orbital vein. This way is far fetched. If the worms are supposed to travel against the blood current in the portal system, this is to reach the bladder which is their normal goal and to which they are attracted by a normal tropism. It is not the same with the superior vena cava. Moreover, the blood current is much stronger in the superior vena cava than in the portal vein and such a supposition would imply multiple bilharzial lesions in the head and body which is not the case.

2. The worms pass from the right side of the heart to the left side through a patent foramen ovale. This way, although possible

theoretically, was not confirmed practically. The cases reported and examined by Ahmed Kamel had no heart defects.

3. The worms pass from the right side of the heart to the left side through the pulmonary capillaries. This, as already stated, is impossible if we know that the breadth of the male worm is 1 mm. and the diameter of the pulmonary capillaries is 8 to 10 u. Moreover, Ahmed Kamel found no bilharziasis of lung and no eosinophilia in sputum.

Finally, I have to thank Dr. Wilson, Director of the Memorial Ophthalmic Laboratory, Giza, for allowing me to publish this case and to have the microphotographs. My thanks are also due to Dr. A. F. El-Tobgy and Dr. Ahmed Kamel for their advice and to Dr. Farouk for providing the clinical material and the pathological specimen.

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A CASE OF SECONDARY OBLIQUE FACIAL CLEFT*

BY

A. MELLICK, Major, R.A.M.C.

PTE. P.L., age 20 years was referred to the ophthalmic centre for treatment of blepharitis of the left eye. On examination there was seen to be present a narrow bridge of skin passing down from the

* Received for publication, September 18, 1945.

upper lid in the region of the lacrimal punctum to become continuous with the semilunar fold (Figs. 1 and 2). In the centre of the bridge of skin, in the line of the upper lid margin, there was a small depression which admitted a fine horse hair in a medial direction for a distance of about 1·5 mm.

The lower lid showed a slight degree of notching between the inferior punctum and the medial canthus, a shallow downward curve replacing the normal straight line of the lid margin. Fluid passed freely into the nose on syringing the lacrimal sac through the inferior punctum. X-ray examination after lipiodol injection disclosed no abnormality of the lacrimal sac and duct (Fig. 4). The caruncle was normal, and there was no interference with the motility of the globe. No other abnormality of the eye was found.

The right eye was normal, and the family history negative.

The question of the mode of origin of lid colobomata in general is not settled. They are not hereditary, and are often associated with malformations and cicatricial bands of skin in the neighbourhood. Clefts in the lids, and adhesions between the lids and globe do not occur in the course of normal development, and therefore

FIG. 1.

FIG. 2.

cannot be due to arrest of growth[1]. Their appearance is suggestive of some external mechanical agency, and van Duyse's theory that they are caused by the pressure of amniotic bands or adhesions explains their occurrence better than any other.

In recent years there has been much scepticism regarding the ability of amniotic bands to cause congenital defects and deformities, but this has probably been due to over-enthusiasm on the part of supporters of the theory, who have attempted to ascribe to it too large a variety of congenital anomalies. Hippel's statement[2] that

FIG. 3.

"there is no reason to repudiate the theory, or to generalise it" summarises our own views.

Fig. 3 is reproduced from the exhaustive article by Ask and van der Hoeve[3], and in our opinion demonstrates conclusively that amniotic bands can effect adversely the normal course of development of the human eye. According to these authors, these bands can be effective in various positions, and according to the direction in which they occur, fifteen different types of defect can be produced, *e.g.*, the band may pass through the sac, through either or both canaliculi, or colobomata of the lid may be produced without the canaliculi being involved. These are all included under the general heading of secondary oblique facial cleft[4].

During the period of embryological development of the lids, the lid-folds become adherent, and it is during this period that differentiation of the lid-margin and its appendages occurs. Seefelder[5] has suggested that failure of part of the lid to become adherent, or, alternatively, breaking down of the adhesion, would cause the defect. This theory would account for the failure in development

FIG. 4.

X-ray photograph of lacrimal sac and duct after lipiodal injection.

of the marginal structures in the coloboma. We do not think this theory satisfactorily explains the great variety of congenital abnormalities in this region.

Summary

A case of partial oblique facial cleft with unusual features is decribed, showing non-development of the upper canaliculus, a bridge of skin passing from the upper lid to the plica semilunaris, shallow coloboma of the lower lid, with patency of the inferior canaliculus and naso-lacrimal duct. It is assumed that adhesion or pressure of amniotic bands is the cause of this anomaly.

I have to thank Professor A. Loewenstein of the Department of Ophthalmology, Glasgow University, for his valuable advice, and Mr. John Watt of the Department of Ophthalmology for the excellent photographs.

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THE RELATION OF CORNEAL VASCULARISATION AND CONJUNCTIVAL TRANSPARENCY TO GENERAL DISEASE*

BY

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THE relation of corneal vascularisation and of conjunctival transparency to nutritional deficiency have already been described (Lyle, Macrae and Gardiner, 1944; Gardiner, 1944). The former communication showed that a high limbal score indicating increased corneal vascularisation occurred in groups of people who were living on inadequate or unbalanced diets. The latter investigation showed that increased conjunctival transparency was associated with increased corneal vascularisation and also with inadequate diets. It is hoped to show that these ocular signs are also related to the incidence of disease and therefore that they are useful in the assessment of health.

Plan of experiment

The eyes of about 190 unselected members of an R.A.F. Hospital staff were examined with the slit-lamp. A second group was examined which consisted of about 150 Service personnel who were ill. This group was made up of four sub-groups which consisted of patients suffering from :—

1. Proven duodenal ulcers ... ... (60)
2. Other chronic gastro-intestinal diseases ... (35)
3. Fibrositis and/or arthritis ... ... (30)
4. Chronic chest or chronic skin diseases ... (19)

In all these sub-groups no subjects with a doubtful diagnosis or double pathology were examined except in sub-group 3, and the condition was in every instance severe enough to warrant their being in hospital or being invalided from the Service. It will be observed that the diseases mentioned are all of a chronic nature. The figures in parentheses are the numbers examined in each group.

The healthy group was under Service conditions and therefore a relatively accurate record of the incidence of sickness could be obtained since their arrival at the unit. An analysis was made of the number of times each individual in this group had reported sick for any cause except trauma, before the examination. This analysis was made after the examination took place. Investigation showed there were probably only a few cases of concealed or unreported sickness. The mean number of times per quarter that a subject reported sick was termed the sick index. Those subjects

* Received for publication, November 27, 1945.

whose records were available for less than three months were not included in the analysis. On an average records were available for 6 months though a considerable number of subjects had records for a year or more. A follow-up was also undertaken for 3 months after the examination.

The results obtained are noted and discussed separately for each ocular sign.

A.—Corneal vascularisation

The same system of notation was used to assess the vascularity of the limbus as was used in former surveys (Lyle, Macrae and Gardiner, 1944).

Table I shows the mean vascularity of the cornea in healthy and ill people.

TABLE I

Vascularity of the cornea in the healthy and the diseased

	Healthy	Ill
Number examined	191	146
Mean limbal score	6·4	7·7
S.E. of difference	±0·35	

This table indicates a statistically significant difference in the vascularity of the two groups.

Table II shows the sick index of the healthy group correlated with the corneal vascularity.

TABLE II

Correlation of sick index and vascularity (pre-exam.)

Limbal score	0–5	6–11	12–19
Number examined	76	78	13
Mean sick index per quarter	0·36	0·44	0·59
Mean number of months at Unit before first sick report	6·2	4·5	3·1
Mean number of months at Unit before first sick report (excluding those not reporting)	3·8	3·2	2·3
Per cent. with no sick reports	43	32	

This table shows that a low degree of limbal vascularity was accompanied by a lower sick index and a high degree of vascularity by a higher sick index. Those with a low degree of vascularity were on the average twice as long at the unit before reporting sick, as those with a high degree of vascularity. This figure includes those who did not report sick at all. The results would be more marked if the ultimate period elapsing in these instances were known. They have been included as though they had reported sick on the day of their examination. The latter results as they stand are statistically significant between the group with scores of 0-5 and the group with scores of 12-19.

It will also be noticed that if only those who did report sick are considered, there is a similar difference in the periods after arrival at the unit, before the first sick report was made. Those with high corneal vascularity reported 2·3 months after arrival and those with a low vascularity 3·8 months. The difference in the mean sick index are therefore not entirely due to the numbers who did not report sick in each particular group.

No certain correlation was found between vascularity and subjective impressions of weight changes. The sick index of those who gained weight was 0·31 and those who lost was 0·45 but this was not statistically significant.

No correlation could be obtained between the type of illness reported and the degree of vascularity. The largest type of illness reported was upper respiratory infection. It should be noted that only a negligible proportion reported sick on account of their eyes. There was no correlation between the occurrence of ocular symptoms in the healthy group and the degree of corneal vascularisation.

The sick reports for the three months following the examination were also obtained and the results are shown in Table III.

TABLE III

Correlation of sick reports and corneal vascularity (post-exam.)

Limbal score	0-5	6-11	12-19
Number examined	72	80	14
Number reporting sick ...	14	24	4
Percentage	19	30	29

The mean sick index was not necessary in this part of the investigation as all the subjects were under observation for all the period. These figures are not statistically significant but it will be noticed that the percentage of those with a low vascularity who reported sick was lower than those with a high vascularity.

Discussion

Some of these results are statistically significant; viz, the corneal vascularity of the ill group was significantly higher than of the healthy group (Table I), the length of time before reporting sick was significantly greater in those with low degrees of vascularity than in those with high degrees of vascularity (Table II). The remaining results are not significant statistically but they fall into line with and reinforce the conclusions which are to be drawn from the significant results. The broad conclusion is that in disease the degree of corneal vascularisation increases. This conclusion rests on the following results as well as on the statistically significant results.

The three months' follow up indicates that there is a probability that those with higher degrees of vascularity will report sick in greater numbers than those with a low degree of vascularity. The analysis of the sick reports before the examination shows that those with a high degree of vascularity reported sick in greater numbers than those with a low degree of vascularity. In the former case the proportion of those reporting to those not reporting was about 6 to 3 and in the latter case about 4 to 3.

It has already been shown that there is some connection between the degree of corneal vascularisation and states of nutritional deficiency. It is consistent with this that there should be a connection between morbidity and corneal vascularisation. Only a very small proportion of the illnesses recorded in the healthy group were of a kind which would directly and obviously be associated with nutritional or metabolic disorders.

The results are interesting in other ways. First they indicate that examination of the eyes brings to light signs frequently associated with common constitutional diseases. Secondly, the results seem to indicate that the normal cornea is the one which is least vascularised. The exact limit of normality has not yet been established and must still remain in doubt. It is worth noting that a score of less than 6 indicated that no vessels encroach on the clear cornea and it may be that this is the real normal or optimum. Thirdly, the consistence of these results indicates that the system of notation adopted is not unrelated to a true measurement of the degree of vascularity seen. In the great majority of cases the measurement presents no difficulty and the system can be learnt quickly by anyone who is used to the slit-lamp.

B.—Conjunctival transparency

The technique of examining the conjunctiva and the method of grading the degree of transparency has already been described in a previous communication (Gardiner, 1944). A standard graph which showed the mean transparency in 2,500 healthy subjects at various ages was used as a basis of normality in the present investigation. The present results are tabulated so that the subjects fall into three groups, viz, transparency above average; average; and below average. Subjects over 30 years old show less variability in the transparency of the conjunctiva and therefore have not been included.

The same groups were examined as in the first part of the investigation and the following results were found.

TABLE IV

Conjunctival transparency in the healthy and the diseased

	Healthy		Ill	
	No.	Per cent.	No.	Per cent.
Above average	74	42	35	56
Average ...	73	41	23	37
Below average	31	17	4	7

Table IV shows the difference in the distribution of subjects in the healthy and sick groups according to the transparency of their conjunctiva.

Table V correlates the conjunctival transparency in a healthy group of people with the sick incidence.

The figures relating to the number of months before the first sick report do not include the subjects who did not report sick.

This table shows that the rate of sickness amongst those with a high conjunctival transparency was high compared with the rate in those subjects who had a low transparency. The proportion not reporting sick to some extent accounts for this difference. Those with an average transparency show an intermediate incidence of sickness.

None of these results is statistically significant. No correlation was found between subjective impressions of weight changes and the conjunctival transparency.

TABLE V

Correlation of sick index and Conjunctival Transparency (pre-exam.)

	Conjunctival Transparency		
	Above average	Average	Below average
Number examined ...	58	54	21
Mean sick index per quarter	0·48	0·42	0·29
Mean number of months at Unit before first sick report	2·4	2·9	4·5
Per cent. not reporting sick	28	35	48

Table VI shows the incidence of sickness occurring after the examination.

TABLE VI

Correlation of sick index with Conjunctival Transparency (post exam.)

	Conjunctival Transparency		
	Above average	Average	Below average
Number not reporting sick...	42	35	15
Number reporting sick ...	13	14	9
Per cent. reporting sick	24	29	38

This table shows that after the examination those with a transparency below average reported sick more frequently than the others. The figures are not as large as in the preceding tables and again are not significant statistically.

Discussion

The results obtained indicate that the transparency of the conjunctiva has some relation to the health of the individual. As in the instance of the corneal vascularity there was no correlation with

any particular type of disease and although it has been shown that the conjunctival transparency is probably connected with nutritional well being the diseases reported amongst the healthy group were not likely to be of a nutritional origin. The results recorded in Table IV indicate that the transparency is increased in chronic disease and those in Table V indicate that a higher incidence of trivial sickness is also accompanied by an increase in transparency of the conjunctiva. These results are not sufficiently clear cut to render a dogmatic conclusion possible especially in view of the conflicting results obtained after the examination and in the absence of statistical confirmation in Table V. The figures in Table VI are so small in the "below average" group as to be almost worthless. However, it seems probable that the conjunctival changes are not very abrupt and therefore not as sensitive an index over a short term as the vascularity of the cornea.

The combination of a high vascularity and a high transparency occurred too seldom to be compared with a low transparency and low vascularity.

Conclusion

The results obtained from this investigation indicate that slit-lamp examination of the conjunctiva and cornea provides a clue to the amount of trivial sickness amongst a group of people over a period varying between three months and two years before examination and also to the amount of sickness they are likely to suffer from in the three months after examination. It is possible to say that those with a high degree of corneal vascularity are as a group more likely to report sick than those with a low degree of vascularity. The conjunctival results must be considered with more reserve but those with a high transparency reported sick nearly twice as often before examination as those with a low transparency.

The investigation provides very little help in determining the type of illness which influences these signs. It has also failed to indicate any normal level of corneal vascularity. There may be wide individual limits but it is probable that in health the cornea is less likely to be vascularised than in illness. In the present series, however, there were a few subjects with high degrees of vascularity who did not report sick at all. The slit-lamp has already proved its worth in nutritional surveys in the R.A.F., and the present results indicate a somewhat broader field of action in which it may assist.

Summary

The degree of conjunctival transparency and of superficial vascularisation of the cornea are shown to be higher in chronic disease than in health. The degree of superficial vascularisation of the

cornea and the degree of transparency of the conjunctiva are shown to have a relationship to the incidence of sickness in a group of healthy people.

My thanks are due to Group Captain W. A. S. Duck, O.B.E., Commanding Officer of the R.A.F. Hospital, Northallerton, for his permission to carry out this investigation and also to the Staff of the hospital for their co-operation. The Director General of the Royal Air Force Medical Service has kindly given his permission for publication of this paper.

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OCULAR DECOMPENSATION*

BY

E. M. G. GALTON, Major, R.A.M.C.

THE attitude towards the significance of refractive errors, accommodative anomalies and abnormal ocular muscle balance has changed considerably during the past few years. This change has been accelerated by the experience of a certain type gained in the armed forces. In them large numbers of individuals of both sexes were seen, who, in the ordinary course of events would never have presented themselves for examination. These cases fall into two groups (1) men and women whose visual acuity was found, during routine testing, to fall below required Service standards. (2) Those with headache as the main symptom. This is probably the commonest single complaint met with in the army and is much more frequent than among civilian patients. As very few are allowed to escape an examination for "a refractive error" the number in this group is very large. It may be mentioned in passing that it was in only the minority that an ocular cause for the headache could be substantiated.

When reviewing numbers of cases of these types it is immediately obvious that the majority had been able to do their civilian work quite happily and without difficulty in the presence of refractive errors of all grades very often with some heterophoria as well. It was only when called upon to do other types of work or the same work under less favourable conditions that some of them developed symptoms.

In other words ocular symptoms are due not so much to the

* Received for publication, September 19, 1945.

defects in themselves as to a breakdown in the compensatory factors which exist in even the so called normal eye. These factors are complex and involve psychological and mental as well as physical components. In this connection it is interesting to watch the development of symptoms when an incorrectly orientated cylinder, which has been worn for some time, is replaced in the correct axis. The resistance often shown by the patient to this change is remarkable.

In order to emphasise as strongly as possible the dynamic nature of visual symptomatology it is suggested that the terminology of the cardiologist be adopted. Before Mackenzie the heart murmur was looked on as a disease in itself, patients were treated for their murmurs irrespective of their cardiac capabilities. The conception of functional response to the environment revolutionised the whole approach to the heart case. Ametropia and heterophoria are still too often loked on as errors which must be corrected for themselves or for some supposed connection with other symptoms which are often of a neurotic character.

As in the heart, the ultimate cause of ocular visual symptoms is a breakdown in the neuro-muscular systems involved irrespective of the pathological anatomy present. This decompensation may be caused either by an increase in the amount of work to be done or by a decrease in the neuro-muscular resources available for the habitual tasks. Work is not used here in its mechanical sense but rather as the total of the factors such as size of object, intensity of illumination, background, etc., which are involved in visual occupations.

The great advantage of the term decompensation is that it implies the possibility of compensation. The statement that a patient has 12 degrees of exophoria for the near point gives no indication of the condition he is in, he may be symptom free or may be having considerable difficulty with near work. To say that he has decompensated exophoria of 12 degrees implies that not only is he having symptoms from his defect but that with treatment his previous state of compensation can be attained. Simple physical correction by the prescription of prisms offers little hope of this.

A low hypermetrope suddenly complains of trouble after near work. Up till now he has been well compensated but either his work has increased, the conditions of his work have worsened or he has become debilitated following either some obvious infection such as pneumonia or influenza or some less tangible physical or mental deterioration which can best be described as being " run down." He is suffering from decompensated hypermetropia and can in the majority of cases be treated without glasses. If he is approaching the presbyopic age his powers of recovery are limited, glasses may be needed as a temporary measure and should only be

prescribed as such. To call the condition accommodative asthenopia is really inaccurate as more often than not there is some associated heterophoria which helps to produce the symptoms.

Analogy is a dangerous form of argument and it is not desired to labour the point but it requires little thought to find examples of acute, subacute and chronic decompensation in the intra- or extra-ocular neuro-muscular systems.

This terminology will increase the ease with which the student will be able to acquire a rational viewpoint of the defects of the visual apparatus. Asthenopia of various types and muscle imbalance are terms out of current use in medicine and mean nothing to the average student. The analogy with the heart is sufficiently accurate, is easily understood and would help to bring ocular problems in line with general ideas.

He would realise that the prescription of glasses is the last and by no means the most important detail in dealing with a case of ocular decompensation. Attention must first be directed to the conditions of the man's work, his ocular hygiene and his general health. The correction of these factors may be of more ultimate importance than the prescription of a suitable lens. This is probably the most important indictment of the optician; not his inability to diagnose ocular disease but his inability to refuse glasses to anyone who comes for them.

The large number of people who wear glasses unnecessarily make a happy hunting ground for the quack who professes to cure their eyesight and to relieve them of their spectacles by means of exercises. It would appear as if he had a better appreciation of the dynamic nature of ocular dysfunction than those who prescribe the glasses.

NOTES ON ONCOCERCIASIS IN GUATEMALA*

BY

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ONCOCERCIASIS, or Oncoceircosis, also known as Robles' Disease, or Blinding Disease of Guatemala, is a new nosological entity, caused by a parasite which profoundly affects the visual organ in a great number of cases.

It was discovered in Guatemala in 1915, by Dr. Rodolfo Robles, a Guatemalan physician, prematurely dead, who entrusted the writer

* Received for publication, August 25, 1945.

with the early study of the resulting ocular disturbances. The first paper on this subject was published by the author in the *Amer. Jl. of Ophthal.*, February, 1918.

The disease is endemic in limited regions sharply separated by areas entirely free from it. These regions are, as a rule, devoted to the production of coffee, and are situated at altitudes of 300 to 1,200 metres, on the steep slopes of the Sierra Madre (which is a continuation of the Rocky Mountains) on the Pacific side. In 1926 the existence of the disease was verified in Mexico, but it was not until 1932 that the ocular symptoms of the African oncocerciasis were described in the Belgian Congo. It appears possible that it was imported many years ago to America by African slaves brought by the Spanish monks to work the land.

This comparatively new disease is caused by a filaria, the Onchocerca Volvulus, Leukart, 1893. The fact that the ocular symptoms had not been mentioned in connection with African patients, led at first to the belief that a new American species had been discovered, and it was named Onchocerca Caecutiens, Brumpt, 1919, or the Blinding Filaria of Guatemala. But when visual disturbances were also noted at a later date in the Belgian Congo, doubts as to the identity of the parasites from the two continents were dissipated.

The male filaria measure 0·03 cm. in length and some females as much as 0·50 cm. The filaria, as a rule, live together, one male and several females, forming fibrous tumours which may grow to the size of a pigeon's egg. They develop superficially underneath the skin, showing preference for the subcutaneous cellular tissues of the head, where as many as 21 tumours have been found on a patient.

Microfilaria measure about 300 microns. They emigrate from the tumours and are found at a distance from them. They may be observed in fresh skin, in conjunctival biopsies, and in histological slides of the ocular tissues. With the bio-microscope the microfilarias can easily be seen, alive or dead, between the corneal laminae or swimming with rapid movements in the aqueous, in the vitreous, and on the surface of the iris, at the exact moment of leaving or penetrating its tissues.

Transmission is accomplished through flies of the Simulium species, which act as intermediate hosts. In Guatemala, these species are:—Simulium Ochraceum, S. Maoseri, and S. Avidum. They are nourished on human blood, to obtain which, they sting man during the day. In this act they also suck the microfilarias which are found in the dermis. The microfilarias then develop, and after a period of about 10 days, they reach the stage of maturity to leave the fly. They are then deposited on the surface of the skin, when the fly stings another human being. These future filarias

have the power to perforate and penetrate the skin of their definite host, and are transformed into adult filarias. Up to the present time no other insects have been found to act as carriers.

It is estimated that 20,000 persons in Guatemala are infected with oncocerciasis. Ocular manifestations are observed in 30 per cent. of these, and 2 per cent. are blind. It should be noted, therefore, that a certain proportion of persons infested do not suffer from ocular disturbances.

The symptoms of oncocerciasis may be classified under three heads:—the tumours, mentioned before; the characteristic ocular symptoms which sometimes end in blindness; and some rare cutaneous manifestations which do not interest the ophthalmologist.

The ocular changes are due to a chronic, slow, and insidious process of sclerosis, which takes years to develop. It is caused by the presence of the microfilarias, alive or dead, in the tissues of the eye, and by the secretions and excretions of both microfilarias and filarias. These act both locally and also at a distance, possibly by means of toxic products of protein disintegration.

The early symptoms of oncocercosis are severe photophobia associated with extreme blepharospasm and a distressing sensation as of a foreign body in the eye. At first only a slight ciliary injection is visible, but with the aid of the corneal microscope and the slit-lamp a tenuous superficial punctate keratitis is noted consisting of avascular punctiform infiltrations which are grouped with marked regularity at the ends of the horizontal diameter, leaving the centre of the cornea free.

Other patients come for consultation only when the punctate keratitis has developed further and may be seen with the naked eye, being then composed of infiltrations, dirty white in colour, of a diameter varying from 0·50 to 1 mm. Bio-microscopic examination of this stage shows a deep invasion by elements identical with those on the surface which do not invade the centre. For this reason such patients show only slight decrease in visual acuteness.

In some cases, while the keratitis is in progress, but others independently, a plastic iritis develops which seriously compromises vision. At first the pupil is contracted, reacting poorly to light and accommodation. Synechiae and pseudo-membranes develop which obstruct the pupil and force it downwards giving it a pear-shape. Later, the iris becomes a thin, smooth layer, and vessels, folds, and crypts disappear from its surface. The process usually extends to the uveal tract, and degenerated pigmentary lesions of the choroid and retina with no relation to the vessels have been observed. Their examination is difficult due to the clouding of the vitreous. In advanced cases the ocular tension is low and the process ends by phthisis of the eye. The globe is reduced to a stump which takes the shape of the head of a champagne bottle cork.

Unfortunately, up to the present, no therapeutic agent has been found which acts with good results upon the parasites. Simple extirpation of the tumours has been the treatment from the beginning and continues to be used, but it has no effect upon the microfilarias. These continue to live undisturbed for an undetermined period of time.

Early surgery of the tumours seems to have a favourable influence on the photophobia, the symptom most distressing to the patient. The latter are quite satisfied after the operation because of the relief they experience. The objective lesions persist, however, and do not improve, as the author has observed in an old case 25 years after his first examination.

The sanitary authorities of Guatemala are doing their best to exterminate oncocerciasis. With this end in view, for some years now, groups of health workers have been organized. These visit periodically the infested regions to operate on all the tumours that come to their notice. Under the auspices of the Pan-American Sanitary Bureau, Washington, D.C., Guatemalan delegates recently met with the health authorities of Mexico to make further study upon oncocercosis conditions and to organise a large scale campaign of prophylaxis in both countries. As a result it is hoped that in the near future this serious disease that endangers sight may disappear from the American Continent.

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ANNOTATIONS

The Practice of Medicine

Medical practice was defined by a very witty writer of the last century as "guessing at Nature's intentions and wishes, and then endeavouring to substitute man's."

The book in which this definition was published is a collection of humorous sayings and witty paragraphs arranged alphabetically and has the odd title of "The Tin Trumpet." It was published anonymously but it is well known that we owe it to Horace Smith, who, with his brother James, wrote the "Rejected Addresses."

There must always be a certain amount of truth underlying the guesswork in this definition, especially in the matter of diagnosis. How can we be positive about any condition if there are at least two other possibilities?

Before X-rays were in common use it was quite easy for a surgeon to be uncertain as to the actual state of affairs present in such a condition as fracture of the shaft of one of the long bones in the neighbourhood of a joint. The late Mr. Marmaduke Sheild was fond of telling a story of a gentleman who was brought to London after having injured his shoulder. One surgeon diagnosed a fracture of the humerus and another a dislocation of the shoulder. Both were right and both were wrong, for the X-ray examination showed a fracture of the humerus high up in the region of the neck and also the head of the bone outside the glenoid cavity.

In swellings in the fundus oculi one generally has to balance the probabilities between choroidal neoplasm and retinal cyst, and sometimes even the elect are at fault. On the other hand such an ophthalmic condition as 25° of convergent strabismus can hardly be mistaken for anything else.

Commenting on the last part of the definition we do not see how, in the present state of our knowledge, man can do anything better than he does. If a patient has acute iritis it is no use waiting for Nature either to cure or alleviate the disease. The surgeon will have to get busy quickly.

And however bright the ophthalmological picture in the new world we seem to be entering we imagine that we shall have to go on doing our best, and probably making occasional mistakes, as we have done in the past. State medicine will hardly be Utopian, at any rate at its start; and it will be a very bad day for ophthalmology if a surgeon's reputation is to be gauged from his capabilities at filling up forms rather than by his clinical work.

On Waiting Rooms

The waiting room is the next in order as a continuation of our Doors and Doorplates annotation. *Facilis decensus*, etc., applies here, as it should be and nearly always is, a short and easy step from the front door to the waiting room; the latter is the dining room in disguise and is furnished accordingly.

We are not aware of very much literature on the subject of waiting rooms apart from some jokes in *Punch* about the man who called on his dentist, not to have a tooth stopped, but to do the cross-word in the *Times* newspaper in the waiting room.

Austin Dobson's poem "The Drama of the Doctor's Window" is the nearest approach to this sort of theme with which we are acquainted. He postulated the presence of *The Lancet* and "Jones, on Muscular Decay" on the waiting room table; but most people rely on the daily papers, *Punch*, and illustrated magazines. A vase of flowers in the centre of the table adds to the amenities of the room, but the general aspect of most waiting rooms, it must be confessed, is rather gloomy and austere. Light-fingered gentry have been known to make an appointment with a doctor and to exercise their profession on any small objects of value while they are waiting for admission to the sanctum sanctorum, so it is just as well not to leave valuable silver in evidence. In Victorian times the sideboard of a very well-known consultant was said to have been ornamented with a decanter of sherry and a plate of biscuits to enable those who had to wait a long time to sustain their failing spirits; but such would be out of the question to-day, good sherry being almost unobtainable and Gilbert's "one and seven sherry" being calculated to do one's practice more harm than good.

The question of pictures on the walls is a debatable one. Nowadays most people eschew them, but those who were brought up in Victorian ways appreciate this form of mural decoration. A few good prints add greatly to the look of the room. One very Victorian waiting room with which we were well acquainted had many pictures, mainly of sacred subjects, on the walls; but we suppose that at the present time pictures, if any, are more likely to be secular in kind.

ABSTRACTS

I.—THERAPEUTICS

(1) **Lemoine, A. N. and Lemoine, A. N., Jr. (Kansas City, Missouri).—Penicillin in the treatment of purulent conjunctivitis.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 1428, 1944.

(1) **Lemoine** and **Lemoine** report a case of purulent haemolytic staphylococcal ophthalmia neonatorum treated with local instillation of sodium penicillin drops. The infant had been treated unsuccessfully with sulphathiazole drops for the eyes and tablets had been given by mouth.

Two drops of sodium penicillin 100 Oxford units per c.c. in normal saline were instilled into the eyes every hour. After 23 hours of treatment the culture from the conjunctival sac was negative and there was no discharge.

H. B. STALLARD.

(2) **Vorisek, E. A. and Evans, A. L.—Penicillin administered locally in gonorrhoeal ophthalmia.** *Amer. Jl. Ophthal.*, Vol. XXVIII, p. 520, 1945.

(2) **Vorisek** and **Evans** record a case of unilateral gonococcal conjunctivitis treated at first by the local application of four penicillin drops, 500 units per c.c., one-hourly for 12 hours. After 16 hours of treatment the conjunctival smears were free of diplococci, purulent discharge had ceased and there was marked clinical improvement. On the second day the quantity of penicillin was reduced to 4 drops of 250 units per c.c. 3-hourly. On the seventh day diplococci appeared again in the conjunctival smears. On the twelfth day a typical allergic reaction occurred and penicillin was suspended.

On the thirty-sixth day a course of 5 intra-muscular injections of 10,000 units each was given 3 hourly in the treatment of the urethritis. The allergic manifestations recurred at once in the eye which had been affected, and subsided in a few days.

H. B. STALLARD.

(3) **Smith, I. C. and Struble, G. C. (M.C.), A.U.S.—The use of artificial fever therapy in ophthalmology.** *Amer. Jl. Ophthal.*, Vol. XXVIII, p. 461, 1945.

(3) **Smith** and **Struble** comment about the therapeutic uncertainty of artificial fever induced by intra-venous injections of T.A.B, vaccine. It seems that some service men react erratically to this. A few have developed sensitization to the vaccine and have unduly

high temperatures whilst others show little reaction and low temperatures, 99·6° to 100·6° are produced. The method of placing the patient in the "hypertherm" cabinet seems to be more precise. The authors record good results from short treatment periods of not over 105°F. for two hours in cases of iridocyclitis, choroido-retinitis, secondary glaucoma, retro-bulbar optic neuritis, severe corneal ulcer and corneal abscess, chronic recurrent superficial punctate keratitis, and intra-ocular infection after a penetrating wound.

H. B. STALLARD.

II.—CONJUNCTIVITIS

(1) **Jameson Evans, P. (Birmingham).—Regional treatment of ophthalmia neonatorum.** *Lancet*, ii, p. 334, 1943.

(1) **Jameson Evans** comments on the improved preventive measures against blindness from ophthalmia neonatorum. In 1901 Bishop Harman found that ophthalmia neonatorum was responsible for 36 per cent. of blind L.C.C. children. In Birmingham from 1936-43 there has been only one case of blindness from this source in a population of 1¼ million, yet it has the highest notification rate for this disease in Great Britain.

This result the author attributes to the segregation of infected infants and their mothers in a ward at the Birmingham and Midland Eye Hospital where a specially trained team of nurses carry out the treatment. This has been supplemented by home visits by ophthalmic trained nurses.

A table is given showing the admissions to hospital during the 6 years 1936-42. Since 1938 there is a marked reduction in this number, In only 1 per cent. in the past 5 years has the gonococcus been responsible for the ophthalmia neonatorum. Before 1938 routine treatment consisted in the use of silver nitrate less than 1 per cent. in strength and frequent washing of the conjunctival sac with warm normal saline. Since 1938 sulphapyridine has been a routine measure 0·125g. 6 hourly in milk. Most cases treated by this drug were free from discharge in 4 or 5 days. The incidence of corneal ulceration has been much reduced. If the eyes are not clear of discharge after 2 days of this treatment sulphathiazole is substituted.

H. B. STALLARD.

(2) **Julianelle, L. A. (Saint Louis).—Studies on the infectivity of trachoma.** *Amer. Jl. Ophthal.*, Vol. XXVI, p. 280, 1943.

(2) **Julianelle** successfully grafted human conjunctival cells containing demonstrable trachomatous virus upon the chorio-allantois

of the developing chick embryo. Proliferation of the epithelial cells was not accompanied by multiplication of the virus itself as judged by animal inoculation and microscopic examination.

Propagation of the virus was not detected by direct injections of macerated infective tissues into the yolk. The author suggests that the highly specialized nature of the virus and its prolonged period of lag may explain this failure.

H. B. STALLARD.

III.—MISCELLANEOUS

(1) **Elwyn, Herman M. D. (New York).—Diabetic retinitis.** *Arch. of Ophthal.*, Vol. XXXIV, No. 3, p. 187, September, 1945.

(1) **Elwyn** is of opinion that diabetic retinopathy consists essentially in the development of (1) small, round and irregular haemorrhages; (2) sharply defined white exudates of hyalin and lipoid in the deeper layers of the retina; (3) yellowish white glistening deposits of cholesterol. Other changes are the result of coincidental conditions, such as ageing and arteriosclerosis.

The haemorrhages are found mainly in the area between the upper and lower temporal vessels, and round the disc. They form the most characteristic feature of diabetic retinopathy, and if there are also the small white exudates and glistening deposits, the picture is pathognomonic of diabetes. The relative frequency of the haemorrhages varies with the duration of the disease; thus they were found in 5·7 per cent. of cases where the duration was one year, and in 58·9 per cent. where the duration was over 15 years. They are formed by diapedesis of red blood corpuscles through the walls of the capillaries, owing to the latter being dilated while the blood stream is slowed because of a relative narrowing of the supplying vessel—a condition known as "pre-stasis."

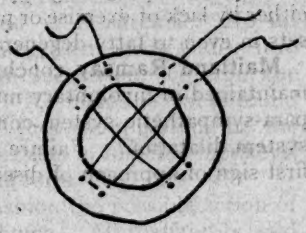
The exudates of hyalin and lipoid are also an expression of insufficient nutrition and deficient oxygen supply. The normal blood sugar level is 80-90 mg. per 100 c.c. and a continuous blood sugar level above this value—say from 130-160 mg.—with or without glycosuria, will cause the development of haemorrhages. Treatment is not yet satisfactory, because it is doubtful whether it is possible to keep the blood sugar of any diabetic patient down to even 100 mg. per 100 c.c., most physicians being satisfied with a level of 130-150 mg.

F. A. W-N.

(2) **Kirby, Daniel B. (New York).—Enucleation of the eyeball.** *Arch. of Ophthal.*, Vol. XXXIV, p. 1, 1945.

(2) Enucleation of the eyeball is commonly regarded as the simplest operation which the ophthalmic surgeon can be called upon to perform; but **Daniel Kirby,** in this article, shows that it is subject to refinements. Standing at the head of the patient, the pericorneal incision of the conjunctiva is begun at the 11 o'clock position, with curved Stevens' scissors, and should be completed, with undermining, in three or at most, four cuts. Tenon's capsule is buttonholed with the same scissors inferotemporally, just below the external rectus, a muscle hook inserted beneath the tendon from below up, and the tendon severed close to the globe. The superior rectus is next divided, the hook being slipped in from the temporal side to avoid the superior oblique, then the inferior rectus and, lastly, the internal. Prolapse of the globe is most conveniently brought about by traction on two double scleral hooks, inserted under the stumps of the internal and external rectus tendons. The nerve is divided by curved enucleation scissors slipped in from the nasal side. The blades must not be opened too widely or be pushed too far beyond the nerve, or the muscle-Tenon capsule will be cut through. This would permit an implant to slip through and wander about in the orbit. The oblique muscles are divided, also the tissue adherent to the back of the globe, and the latter is then removed.

A spherical implant gives as good results as any other shape, but the diameter should not exceed 18 mm. The first step for its insertion is to dissect the conjunctiva from Tenon's capsule. To do this, the assistant holds the conjunctiva with two pairs of forceps, while the surgeon, with forceps on Tenon's capsule, separates it with scissors, round the edge of the incision backwards, for a distance of 6 to 7 mm. Double armed sutures are inserted through Tenon's capsule, as in the diagram. They are drawn aside for insertion of the implant, and then carefully tightened. Before the second suture is drawn secure, the first is tied with a square knot, being firm and taut, but not so tight as to cause pressure necrosis. A double overlap is thus formed, which securely closes the muscle capsule cone over the implant. Search is made, with two muscle hooks, for openings which may require additional sutures, and care must be exercised not to include the tarso-orbital fascia.



The conjunctiva is united horizontally with mattress sutures, and a dressing applied, with strapping and a bandage, which is not disturbed for five days. A temporary prosthesis can be worn within ten to twenty-one days.

F. A. W-N.

(3) **Ramsay, A. Maitland (St. Andrew's).—An analogy between eye strain (asthenopia) and heart strain (angina).** *Glas. Med. Jl.*, Vol. XXV, No. 4, April, 1945.

(3) A study is made of the analogy between the eye and the heart and it is emphasised that every pathological condition at its outset is a modification of a physiological process and that every symptom is a manifestation of disturbed physiology. It follows that the earliest symptoms are therefore those of exhaustion and due to disorder of function rather than of structure.

The involuntary musculature of the eye and heart are compared, the power of automatic contraction, the meridional and circular arrangement of fibres, and the double nerve supply. Equilibrium is maintained by the sympathetic-parasympathetic nerve supply of both organs acting in mutual antagonism and it is pointed out that the parasympathetic supply by oculomotor and vagus nerves is essentially protective and conservative.

Hippus is compared with youthful sinus arrhythmia and the property of iris muscle in amphibia to contract after death bears a strong resemblance to that of the heart muscle.

The reaction of eye and heart to drugs is also similar and the pain produced by the action of physostigmine on the unstriped musculature of the eye and elsewhere is quoted as an example.

Heart strain and eye strain are discussed and although an individual has no direct control of the action of his ciliary or cardiac muscle yet he has a complete control over the conditions which lead to their overaction resulting in the early signs of exhaustion.

The behaviour of these muscles under strain is also comparable as seen in compensating hypertrophy but should the load be removed either by lack of exercise or premature use of spectacles degeneration sets in even to fatty degeneration in the case of cardiac muscle.

Maitland Ramsay concludes that in health perfect balance is maintained in involuntary musculature by double nerve supply: the para-sympathetic system controls contraction and the sympathetic system dilatation. Failure in this balance is in all probability the first sign of approach of disease.

B. W. RYCROFT.

(4) **Meenan, P. N. (Dublin).—The aetiology of trachoma in Ireland.** *Irish. Jl. of Med. Sci.*, November-December, 1945.

(4) This communication is a preliminary report of an investigation into the aetiology of trachoma in Ireland which, aided by a grant from the Medical Research Council of Eire, was undertaken in conjunction with Lavery. The work was begun in 1944, and is still in progress. This report is confined almost exclusively to the laboratory side of the investigation, and the clinical side of the work

is mentioned only in so far as is necessary to interpret and amplify the laboratory findings. A fuller account, incorporating the clinical findings, and the findings with the sulphonamides and penicillin (which work is still in progress) will be made the subject of a later joint publication.

At the present time there are two theories as to the cause of trachoma, that it is due to a Rickettsia or to a virus. The usually accepted criteria for a Rickettsial disease are that the organism should have an arthropod host, and that the Weil-Felix reaction (agglutination with Proteus strains) should be present. Neither of these is present in trachoma.

The virus theory goes back as far as 1907 when Halberstaedter and Prowaczek described the occurrence of granular masses included within the cytoplasm of conjunctival epithelial cells in trachoma. These have two constituents, elementary bodies and initial bodies, which are stages in the life cycle of the virus.

The infective agent is filtrable through a gradocol membrane; elementary bodies are present in the centrifuged filtrate; inoculated into the eye of a human volunteer, who was free from trachoma, the bacteria-free filtrate caused the disease which began acutely (Thygeson).

Wilson has shown that the presence of inclusions composed of elementary bodies constitutes the earliest recognisable pathological change in trachoma, being often found in the absence of bacteria.

The elementary bodies are morphologically indistinguishable from those of psittacosis, inclusion conjunctivitis and lymphogranuloma venereum. Tissue culture usually has been ineffective, though Polev reported some uncomfirmed positive results.

An unexplained experiment by Bland is remarkable. He inoculated trachomatous material containing elementary bodies into the conjunctiva of four grivet monkeys in succession, and from the fourth passage into a human volunteer. No inclusions were found in any of the infected monkeys, but they re-appeared in the volunteer. Almost certainly the virus persists in infected monkeys, but not in a morphologically recognisable form.

Meenan discusses in an interesting fashion the possible action of sulphonamides in the treatment of trachoma. All that can be said is that they may be of value (at any rate by local application, Abstractor). Whether this is due to their effect on secondary invaders, or, as alleged, to a specific effect cannot at present be proved. The balance of probability seems to be weighted against the latter.

The question may be asked at what stage in the life history of trachoma does infection die out? Does it die out at the stage when there are no longer recognisable inclusions or does it carry on into the later or third stage?

The microscopical examination of specimens for inclusions is extremely tedious and a period of at least 90 minutes may be spent in examining a slide before it can be pronounced negative. Even if positive, inclusions may be found in only one cell. In only one of the author's cases were inclusions found in any considerable number.

In all, conjunctival scrapings from 49 cases were examined. Eight of these include normal conjunctiva, spring catarrh, ophthalmia neonatorum and technical mishaps to slides; in none of these were inclusions found. In the 41 cases of clinical trachoma inclusion bodies were found in 36·5 per cent. The author was unable to use cases from the endemic trachoma areas in the country, but was forced to rely very largely on cases which had been under observation before the investigation started, and had been already under treatment. There is no doubt that the percentage of positive findings would have been very much higher if he had had the opportunity of examining more fresh cases.

Inclusions are only found in the following ocular conditions: trachoma, inclusion conjunctivitis, inclusion blennorrhoea and swimming bath conjunctivitis. The differential diagnosis of these conditions *inter se* rests on clinical grounds. Inclusion blennorrhoea of the new-born cannot be confused with trachoma, because the latter never occurs in the new-born. Inclusion conjunctivitis of the adult is a rare disease which begins acutely in one eye, though it may spread to the other; in swimming bath conjunctivitis there is a history of freedom from any eye complaint until after the recent use of a swimming pool. The principal condition with which trachoma may be confused clinically is follicular conjunctivitis, but this should not occur if the ophthalmologist uses his slit-lamp to note the absence of neovascularization of the corneal periphery characteristic of trachoma. Inclusion bodies are not found in follicular conjunctivitis.

The author confirms Braley's observation (*Arch. of Ophthal.*, Vol. XXI, No. 5, p. 735, 1939), as to the occasional presence in the normal conjunctiva of Giemsa-staining intracellular granules. These, however, should not be confused with the Halberstaedter-Prowaczek Körperchen (HPK), or virus inclusion bodies of trachoma.

A. F. MACCALLAN.

BOOK NOTICE

Archivos de la Associación para evitar la Ceguera en Mexico. Vol. III. 1945.

This fasciculus of 282 pages is a credit to the Editors and to the Association for the Prevention of Blindness in Mexico. There are

sixteen papers, one statistical, being on the work of the hospital attached to the association. There are two interesting papers, one on the motility of intra-ocular cysticercus based on a study of eleven cases, and the second a long paper on ocular oncocerciasis. Other papers are on quinine blindness; retinal detachment, the latter on the technique and value of hypertonic injections into Tenon's capsule; squint; orthoptics; anaesthesia in operations for cataract; contact lenses; tuberculosis of the choroid; angio-scotometry; pterygium as well as other papers.

Each paper is furnished with an abstract in English at the end. Paper and printing are good and it is a pity that some of the microphotographs and fundus photographs have not come out better.

CORRESPONDENCE

LACHESINE, A NEW MYDRIATIC

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

DEAR SIRS,—In a recent issue of your Journal, Professor W. J. B. Riddell[1] and Professor Ida Mann[2] reported their independent observations on the clinical use of a new mydriatic, benzilyloxyethyl dimethylethylammonium chloride, which has been known up till now as E3. May I announce that E3 has now been given the name Lachesine (from λάχεσις one of the Fates whose sister ἄτροπος gave her name to atropine)? The new name has been approved by the Director of Research and Development of the Ministry of Supply, who permits me to say that the Ministry's stock of the drug is being distributed by Messrs. Whiffen and Sons Ltd. (of Carnforth Road, Fulham, S.W.6) to whom all enquiries for supplies of Lachesine should be made.

I am, Sirs,

Yours truly,

H. R, ING.

1. *Brit. Jl. Ophthal.*, Vol. XXX, p. 1, 1946.
2. ———, Vol. XXX, p. 8, 1946.

DEPARTMENT OF PHARMACOLOGY,
OXFORD.
February 21, 1946.

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

DEAR SIRS,—I was interested in Professor Milroy Paul's article in your January issue, not only on account of its content but also

because it called up various trains of thought more or less related to his report. Some of these I have jotted down and take the liberty of forwarding.

The impression is given that the choice of the Shugrue operation was largely determined by the greater liability of the Krönlein incision to damage the facial nerve fibres, although "recorded cases make no mention of paralysis of the orbicularis oculi muscles after the operation." Surely the fact is that the classical Krönlein incision is not sufficiently damaging to be followed ordinarily by significant orbicularis paralysis. This is not really so surprising when one considers the anatomical distribution. I am not in a position to comb the many German and French references which bear on the subject; but that orbicularis paralysis may be a sequel is acknowledged by Birsch-Hirschfeld in Elschnig's Augenarztliche Operationslehre (1922 Ed.), although he had not experienced it in 39 cases of his own. This led me to think of what the average ophthalmologist means by "recorded cases" and "the literature." I imagine we risk being wide of the mark unless we qualify these expressions. Few of us have either the time, inclination or ability to make an exhaustive search of the literature. With the help of the Royal Society of Medicine, the Surgeon General's Catalogue and the Cumulative Index however, it is possible to cover all the more widely circulated material, and many of the minor and obscure records. Such searches are often more academic than practical, since the common facts of our art are readily available in text books and obscure observations of good quality tend eventually to come to the surface or be re-discovered. Few of us are likely to quarrel with Professor Paul when he says "the removal of a retrobulbar intra-orbital tumour is a rare event," at all events it is relatively so, especially in the sense he means, viz., removal with conservation of the globe and partial visual function.

The frequency of intra-orbital tumours appears to vary in different parts of the world, and in some places the angiomata are not uncommon relative to other intra-orbital tumours, excluding those extending from the globe. The true encapsulated cavernous angioma may perhaps be regarded as the ophthalmic surgeon's good dream in this field, unless indeed the fronto-ethmoidal mucocele is allowed to compete. This does not apply to a cavernous angioma within the muscle cone, although it is perhaps the least objectionable tumour to find in this situation. I have had the opportunity of exploring large numbers of intra-orbital tumours and removing many of them. I have only once employed the Krönlein approach, rather as an experimental measure and not for a tumour within the muscle cone. Since accurate private records are not readily available I can only be sure of having removed one cavernous

angioma situated truly within the muscle cone, and this by supero-external orbitotomy. There were various other retrobulbar tumours removed by this route, however, and numbers of intra-orbital explorations in the 1 o'clock to 6 o'clock area of the orbital cone. The incision, following the curve of the orbital rim and situated just behind it, ordinarily swept from 1 o'clock to 4 o'clock. This curve does not affect so many facial nerve twigs as the reverse Krönlein curve. It does not appear to give rise to subsequent orbicularis trouble. I have never discussed technique in print or the approach adopted in the various quadrants, but my methods have been so akin to Benedict's in principle that the quotation from him by Spaeth gives a good idea of the approaches which I have used for many years. I am tempted to refer here to certain points in technique not stressed in our surgical text books. The advisability of timely tarsorrhaphy should be borne in mind in certain circumstances. I have known it preserve the sight for years while the globes slowly left the orbits and the skin of the lids became unbelievably thin. Iodoform powder, preferably precipitated and sterilized, freely applied with tampons, is most helpful in dealing with soft tissue ooze, just as wax in the case of bone. The use of the hammer, gouge and nibbling forceps, if and as required, makes for ease. It is surprising what extra access is given by a small amount of external marginal resection. The ophthalmic literature, in places, is apt to decry the chisel and endorse the dental engine and such like. My prediliction for the hammer and chisel was developed in early days by practical instruction at the hands of Alexander and Neuman, masters of craft in the Pollitzer tradition.

In this connection one's thoughts turn to overlapping surgical fields about the orbit. It is perhaps not sufficiently common to find the ophthalmic surgeon well versed in the arts of his colleagues the neuro-surgeon and the E. N. T. surgeon. Practical training, especially in E. N. T. work, makes for greater peace of mind, if, when following up an orbital exploration one exposes part of the nasal cavity or the dura. It is very satisfactory to have such colleagues to co-operate with or even to hand over to in difficult circumstances, but hardly excusable to be other than familiar with their methods if even remotely applicable to our special field. One can hardly imagine a Czermak or an Elschnig hesitating to proceed centrifugally from the orbit across the boundary in any direction demanded by the occasion. On the other hand one welcomes those advances of keen and adventurous colleagues, who ordinarily work in adjoining territories, which enlarge our horizon to the patient's benefit.

These musings are not in any sense intended to detract from Professor Paul's record of a successful retrobulbar operation by an unusual method, on which he is to be congratulated. On the

contrary, were I again situated where the intra-orbital problem was a commonplace, I should like to undertake a Shugrue-Moran approach for the sake of comparison, especially if decompression were an influential factor.

Yours faithfully,

R. E. WRIGHT.

FLEET, HANTS.
February 24, 1946.

LATERAL ORBITOTOMY (Krönlein's Operation)

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

DEAR SIRS,—Professor Milroy Paul in his paper "Cavernous Haemangioma of the orbit successfully removed by Shugrue's operation," *Brit. Jl. Ophthal.*, January, 1946, advises Shugrue's incision for lateral orbitotomy on the grounds that the other classical incisions are liable to cause orbicularis weakness through damage to branches of the seventh nerve.

I cannot claim any greater personal experience of Krönlein's operation than 7 cases, 2 of which were for the removal of a tumour inside the cone of the recti muscles and 5 for intra-orbital foreign bodies. In 5 of them I used a curved incision concentric with the lateral orbital margin from the centre of which a horizontal incision ran posteriorly about the level of the outer canthus over the malar bone and along the upper edge of the zygoma. The 2 flaps thus fashioned by these incisions were undermined at the level of the periosteum of the malar bone and the temporal fascia. In the two other cases 3 incisions made a flap with its base temporally.

In none of these cases was there any residual weakness of the orbicularis appreciated by clinical examination.

I think that the cleanest and least traumatic way of removing the lateral orbital wall is by either Gigli's or Stilli's saw. After the orbital periosteum is carefully separated from the bone it is retracted medially by a flat malleable retractor which serves also to protect the orbital contents. The temporal muscle is also retracted from the frontal process of the malar bone and the loop of one end of Gigli's saw is passed through the anterior extremity of the inferior orbital fissure and the bone cut in the horizontal plane of the lower orbital margin. On a horizontal plane a little above the external angular process and posteriorly at a point a little below where the temporal fossa merges with the base of the middle fossa of the skull a hole is made with an Archimedes drill, fitted with a stop, of sufficient size to allow the passage of the looped end of Gigli's saw.

The upper cut is made in this horizontal plane. The thin plate of bone between the drill hole and the inferior orbital fissure is cut through with a chisel.

Albee's electrically driven saw has certain mechanical disadvantages and the use of a chisel is I think unnecessarily traumatic in dividing the thick parts of the malar bone. The work with a Gigli's saw is done more quickly.

The quadrilateral piece of bone is replaced at the end of the operation. Dissection of an intra-orbital tumour is often done more easily and with the least injury to intra-orbital structures with the operator's gloved forefinger or a straight blunt-ended lacrimal dissector.

Nowadays there is a tendency for the transfrontal approach through the roof of the orbit to be favoured instead of Krönlein's operation. This is only justified when the optic canal and the bones at the apex of the orbit are involved in a disease process and this is the intra-cranial extension. In cases where the tumour is limited to the orbit the approach through the lateral wall of the orbit is the more direct, the less traumatic and dangerous, and more likely to succeed in removing the tumour.

Yours faithfully,

H. B. STALLARD.

LONDON, W.1.

NOTES

Death

AS we go to press we regret to record the death of A. Maitland Ramsay on March 20. We hope to give an obituary notice in our next number.

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Appointment

MR. J. COLE MARSHALL has been elected Consulting Surgeon to the Western Ophthalmic Hospital on completion of his term of active service there. He is also a Life Governor and Trustee of the Institution.

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Irish Ophthalmological Society Annual Meeting

THE Annual Meeting of the Irish Ophthalmological Society will be held on May 9, 10 and 11, in Dublin. The Montgomery Lecture will be delivered by Sir Stewart Duke-Elder on the 9th. Members

of the U.K. and Affiliated Ophthalmological Societies who wish to attend should communicate with the Hon. Sec., 6 Fitzwilliam Square, Dublin.

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Association for the Prevention of Blindness, in Bengal. 15th Annual Report 1944-45

THE 15th Annual Report of the Association shows that in spite of war conditions more work has been done in 1945 than in the previous year. Lack of financial support is the main handicap. The committee appointed to advise on the prevention of blindness has made recommendations of great importance. Hopes of eventually being able to render couching illegal are expressed.

Lieut.-Col. Kirwan, C.I.E. has retired and the vacancy thus caused has been filled by the appointment of Captain E. J. Somerset.

Propaganda has been continued by means of lectures and by magic lantern slides and posters.

Five travelling dispensaries have been at work in Bengal during the year; and their reports are presented here. Table III shows the enumeration of blind persons carried out by medical officers of the travelling dispensaries of the Association and is of great value. Details of finance are also included.

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Ophthalmological Society of Madrid

THE Inaugural address for the Session 1945-46 was given by the President, Dr. Marin Amat on "The mechanism of the action of the anti-glaucomatous operations."

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Corrigendum

OUR attention has been drawn to an error in "Index of Subjects," *Brit. Jl. Ophthal.*, Vol. XXVIII. For "Association for the Prevention of Blindness" read "Prevention of Blindness. Committee of the National Institute for the Blind." On page 372 of the same volume there is a reference to the presentation of a research microscope. This was a generous gift of the National Institute for the Blind.